PB-230 535

POLLUTION OF THE INTERSTATE WATERS OF THE GRAND CALUMET RIVER, LITTLE CALUMET RIVER, CALUMET RIVER, WOLF LAKE, LAKE MICHIGAN, AND THEIR TRIBUTARIES. PROCEEDINGS OF CONFERENCE (TECHNICAL SESSION), HELD AT CHICAGO, ILLINOIS ON JANUARY 4-5, 1966. VOLUME 2.

Federal Water Pollution Control Administration
Washington, D.C.

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VOLUME 2

Conference

In the matter of Pollution of the Interstate Waters of the Grand Calumet River, Little Calumet River, Calumet River, Wolf Lake, Lake Michigan and their Tributaries

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TECHNICAL SESSION
JANUARY 4-5, 1966

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

172

CONTENTS

	Page
Murray Stein	4, 574
H. W. Poston	15, 571
Grover Cook	21, 158
Francis Kittrell	107
Commander Charles E. Waite	163
B. A. Poole	172
Perry Miller	175
Major A. Martin Katz	209
Major John B. Nicosia	219, 249
Cornell A. Leahu	324
A. G. Giannini	305
Clark N. Johnson	317
Herbert J. Dunsmore	321, [illegible]
Joseph Baum	342
George A. Blaine	351
E. D. Keiper, Jr.	362
James E. Kirkpatrick	386
Ross Harbaugh	408
Bruce Burns	426
Russell Mallatt	433
George K. McIntosh	449
Clarence W. Klassen	463
Colonel F. W. Chesrow	480

C O N T E N T S (Continued)

	Page
Louis F. Birkel	515
J. H. Miller	525
Harry Henderson	543
Charles Murphy	560

* * *

A F T E R N O O N S E S S I O N

2:15 p.m.

MR. STEIN: May we reconvene?

Mr. Poole.

MR. POOLE: Mr. Chairman, as I outlined this morning, the Indiana part of this program consisted of Mr. Miller's remarks, which you have already heard, and then we have the Mayors of Gary and East Chicago and Hammond who are either here in person or by representatives, and then nine industries.

At this time I am going to call on Mayor A. Martin Katz of the city of Gary, who has a brief report for you on the activities and the future of things in so far as the city Gary is concerned.

Mayor A. Martin Katz

STATEMENT OF

HONORABLE A. MARTIN KATZ, MAYOR, GARY, INDIANA

MAYOR KATZ: Thank you, Mr. Poole. Chairman Stein, Mr. Poston, distinguished gentlemen at the table here on the platform, ladies and gentlemen:

Early in December the city of Gary was invited by Mr. Poole of the Indiana State Board of Health to give a brief progress report on Gary's program of water pollution abatement. This I am happy to do at this time.

I can say to you that since 1952 the Gary Sanitary District has been able to obtain results that are more than adequate and consistent with results that can be expected from a conventional activated sludge plant such as the Gary Sanitary Plant.

This quality effluent is given further treatment by chlorination, sufficient to produce disinfection of the effluent and leave a 1 milligram per liter residual at the design flow of 90 million gallons per day. The facilities for chlorinate were designed to meet the "Recommended Standards for Sewage Works" adopted by the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers, of which both the States of Illinois and Indiana are members. The plans for the recent expansion of this main plant to 90 million gallons per day were received and approved by

the Stream Pollution Control Board, State Board of Health, Indianapolis, to meet these same so-called "10-States Standards."

The chlorinated effluent from this activated sludge plant does not discharge directly into Lake Michigan, but rather into the Grand Calumet River approximately 4.25 miles upstream from the Indiana Harbor Canal. This canal extends north from this junction approximately 3.5 miles through heavy industrial area to an outlet in Lake Michigan in Indiana Harbor.

It is apparent from just visual observation that the treatment plant effluent is discharged to a stream where the high degree of treatment is lost because of upstream pollution. Where the high quality effluent might serve to improve the stream if the flow was low, the high volume of flow in the Grand Calumet River quickly reduces the relatively small volume of effluent to the quality present in the river.

The combined sewers of the Gary Sanitary District are controlled at critical locations by Brown & Brown type sewage regulators. These regulators when properly operated will divert all dry weather flow into the interceptor system carrying the sewage to the main Gary sewage treatment plant. Only during high storm water flows, when substantial dilution

is available in the sewers themselves as well as the receiving streams, will the regulators allow discharge of excess flow directly into the receiving stream. None of these regulators discharge directly into Lake Michigan but discharge either to water courses like the Grand Calumet River, the Little Calumet River or to Burns Ditch.

The recent installation of storm water pumping facilities in the 42nd Avenue area receives a separated storm water flow from this limited area and pumps it directly into the Little Calumet River. Sanitary sewage from this section of Gary is still directed to the Alley 1 East interceptor and thus to the main Gary sewage treatment plant.

The 90,000,000 gallon design capacity of the recently expanded Gary main sewage treatment plant assures capacity for many years into the future. An activated sludge process with chlorination of the final effluent provides the facilities for treatment to a degree considered by the profession to be more than adequate for discharge to any stream with little or no dilution. The Grand Calumet River, at the point of discharge, has substantial flow at all times of the year, and the effluent from the treatment plant, properly operated, can be expected to exceed any reasonable standard for the Grand Calumet River.

The main sewage treatment plant at the Gary

Sanitary District is a conventional activated sludge plant with separate heated sludge digestion. Mechanically cleaned bar screens, with one-inch openings, remove large floating and suspended material which is disposed of by burying on the plant site. Two large grit chambers remove the sand and other inorganic grit particles for flows up to 90,000,000 gallons per day. These units are designed to remove 95 per cent of 100-mesh material. Removing the grit preceding the organic treatment units assures that these latter units are available for their intended purpose of removing suspended and dissolved organic materials.

Eight primary sedimentation basins remove the heavier organic solids which are in turn pumped into the five primary and three secondary separate sludge digesters.

Sewage leaving the primary sedimentation tanks is further treated in the activated sludge process through the 15 300-foot long, 30-foot wide and 20-foot deep aeration tanks. In these units the return activated sludge is mixed with the settled sewage, and ample air is diffused through the mixture to provide oxygen for metabolism of the purifying organisms and mixing of the contents. The mixed liquor from the aeration tanks is discharged to 16 secondary sedimentation basins, where final clarification of the sewage is accomplished.

The treated effluent is discharged through the

chlorine contact facilities, where the chlorine solution is injected into the effluent, and which is sufficient to produce one milligram per liter of residual after 15 minutes of contact at a maximum flow of 90,000,000 gallons. This contact time with the chlorine solution insures the disinfection of the effluent of all pathogenic organisms before its discharge into the Grand Calumet River.

It should be obvious that the city of Gary at the present time has a completely integrated sewage treatment works with a capacity of 90,000,000 gallons of fully treated waste water per day.

We are presently negotiating with our largest industry, United States Steel Corporation, and with other smaller industries for the treatment of their waste waters by and through our treatment plants. There are details yet to be evaluated, but I am sure these will be resolved to the mutual satisfaction of all in the future and to the satisfaction of the industries who as you well know also have their problems.

Our Division of Water Pollution has been in operation since June 1965. It has complete laboratory facilities for the analysis of water. Our Department of Health has increased its capabilities in its analysis of bacteriological contaminants in waste water. These two agencies are instructed to investigate and bring to my personal attention any

Mayor Martin A. Katz

causes of pollution so we may pursue all methods at our disposal for control.

These are steps we have taken since our last meeting. To my way of thinking these are constructive gains, gains we intend to fully utilize and pursue. We have combined sewers, as do most cities of any size and age. However, we realize that this is a problem that cannot be ignored, but it is a problem of such economic magnitude for which I know of no practical and reasonable answer at this time. I can assure you, however, that there will be no combined sewers constructed in the city of Gary in the future, and that wherever possible in the future the systems will be separated.

In closing, I must point out to you that I was greatly disturbed by a recent article which appeared in the news media throughout the Chicago Metropolitan area, and which appeared in the GARY POST-TRIBUNE on December 8th, 1965, under an Associated Press byline. It quoted Mr. Frank Chesrow, president of the Chicago Sanitary District, as saying, and I quote, "Asking Federal assistance to stop three northwest Indiana cities from pouring untreated sewage into Lake Michigan."

Mr. Chesrow singled out Gary, East Chicago and Hammond. I am sure that the Mayors of East Chicago and

Mayor Martin A. Katz

Hammond can and will speak for themselves. In my opinion the president of the Chicago Sanitary District is sending out a "smoke screen" to divert attention from his own inability to cope with the problem.

Speaking as Mayor of the City of Gary, I deny the veracity of his statement and I challenge him to prove the ability of his three treatment plants to give as complete treatment as does the Gary Sanitary District Plant.

We of the City of Gary are much more interested in arresting the present sources of pollution and preventing new ones than we are in dealing in charges and accusations. We seek good counsel and aid. We seek assistance from all, because this is a problem that can only be solved with assistance and cooperation from all.

If Mr. Chesrow desires to meet with me to discuss our mutual problem, I personally invite him to do so at his convenience, rather than to carry on his "smoke screen" of accusations in the newspapers.

Gary's future growth depends upon its availability to a source of good water, and I am pledged to pursue the control of air and water pollution.

I offer again to the Federal government, to the State of Indiana, to our local businesses and industries, to any and everyone our full cooperation and the use of all

facilities at our disposal.

Thank you.

MR. STEIN: Thank you, Mayor Katz, for a very forthright statement.

Are there any comments or questions?

Mr. Klassen.

MR. KLASSEN: Mr. Chairman, if the smoke has subsided, I would just like to ask Mayor Katz one question. It may be in here, Mayor, but I will tell you what I am primarily interested in from the Illinois Sanitary Water Board standpoint is the flow at times of rain that may be diverted or overflowed into the Little Calumet River.

I just wondered if I am correct in reading this that Gary takes 90,000,000 gallons of sewage through their treatment facilities at time of rain. Is this correct?

MAYOR KATZ: We are equipped to take 90,000,000. I don't think we are carrying that heavy a load at the present time.

MR. KLASSEN: This is, then, a point that I want to get some information on.

To minimize the combined sewer overflow into the Little Calumet, which comes into Illinois, an area over which the Sanitary Water Board has jurisdiction, what are Gary's plans or why are they not utilizing their total plant

capacity at time of rainfall and treating as much of the combined sewage at that time as possible?

Do you plan to do this? And if so, would you tell us when? And why aren't you doing it now?

MAYOR KATZ: Mr. Klassen, perhaps I can give you a layman's answer. I believe our sanitary engineer is here and can probably give you a more technical answer.

As I understand it, at times of great rainfall, when the rush of the water is so great as to be greater than the ability of the system to carry it, we do have the problem that you are talking about, and there is a deposit into the Little Calumet.

The only way that I know of that that can be eliminated is through the elimination of combined sewers, of course, which is a long-range problem and a problem that we are directing our attention to in the future.

I don't know. Perhaps Mr. Angelidis can give a more specific answer to the rest of the question. Mr. Angelidis is a sanitary engineer for the city of Gary.

MR. ANGELIDIS: The plant was just completed in June, and actually the plant is not in full operation. As soon as this plant is put in complete operation and the bugs are taken out of it -- there are still pumping units that are not fully activated -- the plant will operate at the capacity

of flow.

MR. KLASSEN: Thank you.

MR. STEIN: Are there any further questions or comments?

Mr. Poole.

MR. POOLE: Let me ask you this question, Mr. Angelidis. This came up in the March conference, and I don't think it was answered as precisely as it could be.

My question to Mr. Angelidis is that I think there is capacity at the Gary sewage treatment plant to go through the primary tanks with a good deal more than the dry weather flow. This is the custom in most sewage treatment plants that serve combined sewer systems. That is, normally we say as a rule of thumb that you gravitate two and a half to three times your dry-weather flow through primary tanks, which gives partial treatment, and then you bypass part of it and take what you can through the secondary unit.

Now, my question to you, Chris, is: Do you know what the capacity of the pumping stations is at Gary or how much you can get to the primary tanks during periods of storm?

MR. ANGELIDIS: I am not familiar with that. Bill knows more about that, and he is not here. That is Bill Matthews. But I understand it is around 40,000,000. This is pumping capacity.

MR. POOLE: You mean above the normal dry-weather flow?

MR. ANGELIDIS: No, not above. That is the total.

MR. POOLE: I guess we still haven't answered the question. I will try to have that for the next session.

MR. STEIN: I think this question has come up before. I think what Mr. Poole asked is a factor, and it should be able to be resolved in the future.

MAYOR KATZ: If you give me that question in writing, Mr. Poole, so I know what I am trying to find out, I will have the answer for you.

MR. POOLE: I expect Mr. Hurt in my office knows, Mayor, but if not we will explore it in writing or by telephone.

MAYOR KATZ: Very well.

MR. STEIN: Are there any further questions or comments?

(No response.)

If not, thank you very much, Mayor.

Mr. Poole.

MR. POOLE: Next I call on Mayor John B. Nicosia of the City of East Chicago.

Mayor John B. Nicosia

STATEMENT OF

HONORABLE DR. JOHN B. NICOSIA, MAYOR,

EAST CHICAGO, INDIANA

MAYOR NICOSIA: Ladies and gentlemen, my name is Dr. John B. Nicosia, Mayor of East Chicago, Indiana.

The problem of water pollution abatement is one of far greater magnitude than is realized by most people. We, who by education and experience are the community technically qualified to direct effective water management, have not translated technical competency into that professional responsibility necessary for leadership. There is no better example of this failure than to see the deterioration all around us of our greatest natural resource, namely, water.

There are many possible reasons for this failure, with self-evaluation undoubtedly at odds with evaluation by others.

But regardless of how we rationalize our activity the result is the same. The wisdom of those currently engaged in water management is broad and detailed -- but as ineffective as their erudite literature, piled on shelves in a locked library.

When these same persons attend public meetings, the presentations have a different nature. Conformance with the theme of the meeting is the rule and not the exception.

Mayor John B. Nicosia

Private opinions are not expressed. Concurrence is given by silent consent or expressed generalizations which may be easily construed to conform to a variety of opinions.

This type of failure is the reason for this meeting. The damage which will accrue to the national welfare if this failure is not corrected is of great significance.

If those technically competent and those who have a public responsibility through their employment in public agencies had been effectively defining criteria and abating pollution, we would have little reason to explore these issues today. Unless this meeting generates a "new birth of freedom" and translates technical competency into professional responsibility, we should adjourn to the Bar where our purpose in life can be understood by us and the public.

For any given portion of an interstate water the regulatory agency of the State involved must accept its responsibility and provide the decisions on the quality desired for protection of the uses intended. The municipalities, too, must also assume their responsibilities in a judicious manner to alleviate problems that may be incurred by industries within the municipality. With some judicious reasoning, water quality improvement will be assured and the concerns of industry, municipalities, agriculture and conservationists allayed. Water resources can be protected, and yet there

will not be the economic waste involved in treatment for treatment's sake.

We in East Chicago have taken steps to alleviate a particular problem for industry. The East Chicago Sanitary District has been accepting, since May of this year, and is continuing to accept ammonia still waste from our two basic steel industries, Inland Steel and Youngstown Sheet and Tube. We have signed an agreement with Youngstown Sheet and Tube and Inland Steel to accept a half a million gallons of their ammonia still waste from the coke plant daily. That is, 1,000,000 gallons come through our plant. The removal of phenolics and reduction of suspended solids have been dramatic.

Work such as this can be accomplished only by taking the stance of how can we be of help to our industries and not assuming the attitude of this being out of the realm of municipal responsibility. We feel that by assisting industry to alleviate a burdensome program from their shoulders we have given a boost to the working man employed by industry.

We are carrying this program still farther. We have on the drawing boards a water treatment plant designed to treat domestic sewage almost to the point of potability. Our plan is to recycle this water to industry for once-through

re-use for cooling. This would eliminate the discharge of sewage treatment plant effluent into the receiving stream.

Also on the drawing boards and presently being excavated is a revolutionary stormwater treatment basin. This basin is designed to take stormwater runoff and treat it prior to discharge into the receiving stream.

Our city has the same problems entertained by all other old and established industrial centers, and that is lack of space. This basin is designed to take up the minimum amount of area and yet accomplish the treatment which could, under normal circumstances, require vast areas. Technologically the theory is sound but has never before been proposed or tried. We in the municipal government have taken it upon ourselves to assume the responsibility of attempting new, practical and feasible approaches to this problem of water pollution abatement.

East Chicago invites industrial and labor management to recognize that adequate area pollution control must include both municipal and industrial controls, and a joint approach will be most effective. We should all return home from this meeting with the knowledge that we have initiated a program of immediate remedial action and to develop the most effective means for utilizing municipal and industrial facilities in order to accomplish positive

protection of water quality in the area for the most desirable, beneficial and practicable use.

Observe the turtle: He only makes progress when he sticks his neck out.

Is it possible to attain water quality controls? The means to define it are available; the means to attain it are available; but the initiative, imagination, adaptability, industriousness, and decision required can only be supplied by those whose personal interests are involved. Harnessing these forces takes competent editorial, political and technical leaderships. Will you people stick your necks out?

Ladies and gentlemen, I would like to introduce you to my Superintendent of the Sanitary District, who would like to present the technical part of our presentation.

Mr. Cornell A. Leahu.

Thank you.

Cornel A. Leahu

STATEMENT OF

CORNEL A. LEAHU, SUPERINTENDENT,

THE SANITARY DISTRICT OF EAST CHICAGO, INDIANA

MR. LEAHU: Mr. Chairman, conferees, ladies and gentlemen:

My name is Cornel A. Leahu. I am the Superintendent of the Sanitary District of East Chicago, Indiana, on whose behalf I am speaking today.

The terminal goal as far as the Sanitary District of East Chicago is concerned is to keep Lake Michigan as clean and free of pollution as is possible. In so doing, it is the intent of the District to improve the quality of the water in the Grand Calumet River which receives the effluent of the District sewage treatment plant.

Since the purpose of this conference is to disseminate information on the progess of abatement of sources of pollution, Figure 1 was prepared.

May I have slide number one, please? I will have to apologize for the poor quality of the slides that we have. These slides were a reproduction of last year's meeting.

(Figure 1 follows:)

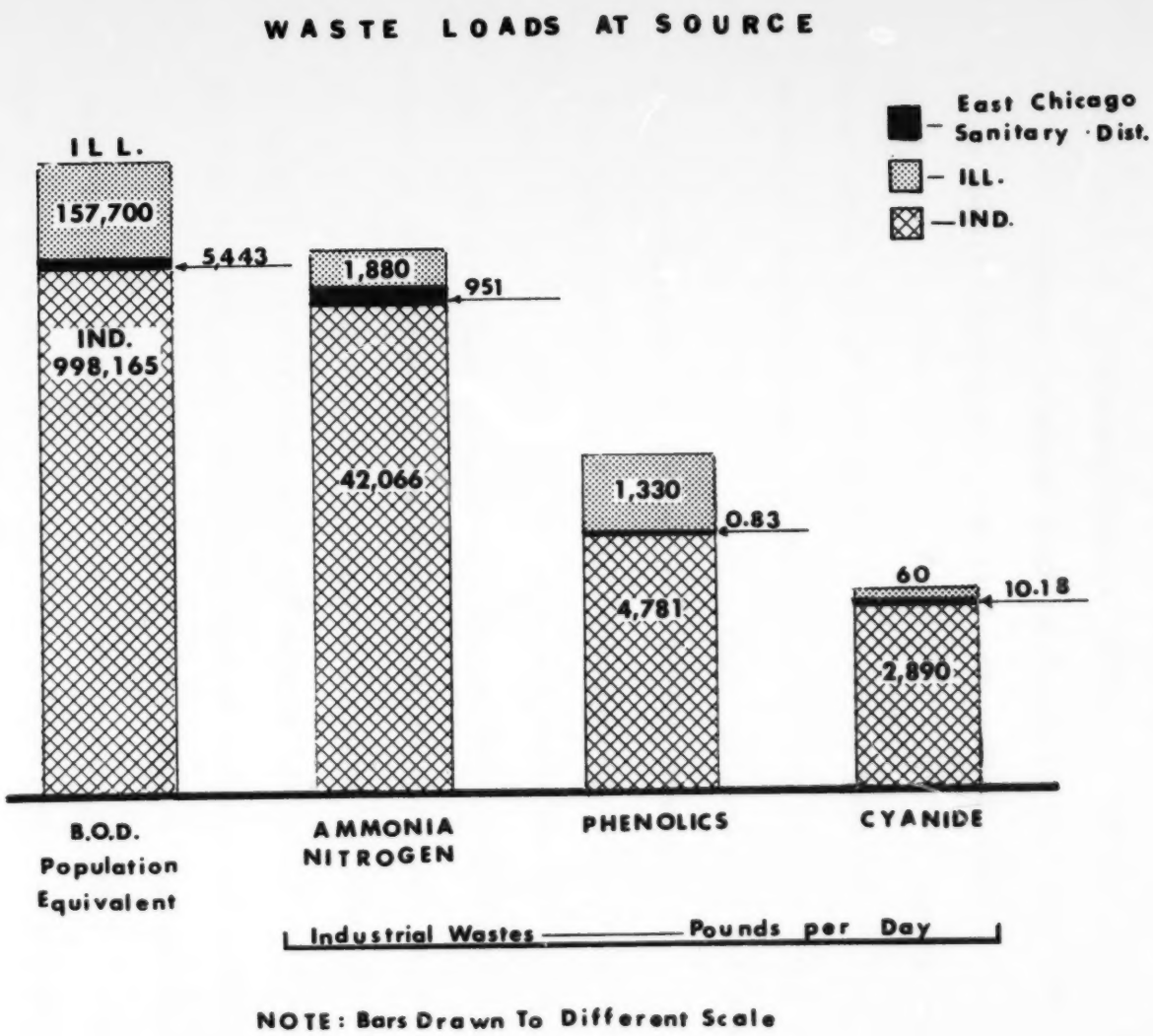
WASTE LOADS AT SOURCE
East Chicago Sanitary Dist.
ILL.
IND.
ILL.
157,700
5,443
IND.
998,165
1,880
951
42,066
1,330
0.83
4,781
60
10.18
2,890
B.O.D. Population Equivalent
AMMONIA NITROGEN
PHENOLICS
CYANIDE
Industrial Wastes — Pounds per Day
NOTE: Bars Drawn To Different Scale

Figure 1

Cornel A. Leahu

On the left is the BOD population equivalent, with Indiana 998,165. The total for Illinois is 157,700. That attributable to East Chicago is in red at 5,443. This is the waste load at the source.

The ammonia-nitrogen, which is your second column, attributable to Indiana is 42,066 in pounds per day and 1,880 for Illinois in pounds per day. The total emanating out of the East Chicago Sanitary District is 951.

Phenolics, which is the third bar, is 4,781 for Indiana, 1,330 for Illinois, and 0.83 for the East Chicago Sanitary District.

Cyanide, the last on the industrial wastes, is a total of 2,890 for Indiana, 60 for Illinois and 10.18 pounds per day for the East Chicago Sanitary District.

This graph was made employing data in Tables VI-1, VI-2, VI-5 and VI-6 of the "Report on Pollution of the Water of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their tributaries, Illinois-Indiana," dated February 1965 by the U. S. Public Health Service.

Figure 1 compares waste loads at the source (i.e., point of outfall of discharge) for four parameters of pollution: Population equivalent based on organic load as measured by BOD (Biochemical Oxygen Demand), phenolics,

ammonia nitrogen, and cyanide. The sources are divided into following areas of origin: Indiana (as shown at the bottom of each bar graph), and the State of Illinois -- including the Metropolitan Sanitary District of Greater Chicago (shown at the top of the bar graph and in figures submitted by Mr. Vinton W. Bacon, General Superintendent of the Metropolitan Sanitary District of Greater Chicago).

The quantities are as near to scale as was possible to achieve, within the individual bar graph, but the bar graphs are drawn to different scales and extrapolated from the tables computed during the run from October through December. The values from which these were drawn are given in Exhibit 1 in the report.

(Exhibit 1 follows:)

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO - INDIANA-ILLINOIS POLLUTION

WASTE LOADS TO LAKE MICHIGAN

PRESENT WASTE LOAD	LOCALITY SOURCE	POPULATION EQUIVALENT			INDUSTRIAL WASTES POUNDS				
		MUNICIPAL	INDUSTRIAL	TOTAL	AMMONIA NITROGEN	TOTAL NITROGEN	PHENOLICS	CYANIDE	OIL
TOTAL LOADS	INDIANA	95,015	903,150	998,165	42,066	54,479	4,781	2,890	107,879
	ILL - TOTAL	108,200	49,500	157,700	1,880	860	1,330	60	10,250
	TOTAL	203,215	952,650	1,155,865	43,946	55,339	6,111	2,950	118,129

BASED ON TABLES VI-1, VI-2, VI-5, VI-6, REPORT ON POLLUTION-----ILLINOIS-INDIANA, U.S. H.E.W. P.H.S.

Exhibit J

Cornell A. Leahu

Based on the population equivalent (PE) pollution parameter, the load attributable to the Sanitary District and discharging to the Grant Calumet River would be 5,443 out of a total 998,165 population equivalent or only .54 per cent of the waste load at the source.

Slide 2, please.

Figure 2 was prepared employing data in Figure VIII-2 of the HEW report. Figure 2 compares coliform densities in the Grand Calumet River based on organisms per 100 milliliters.

The extreme right is East Chicago with a maximum coliform number of 11,000 and an arithmetical average of less than 1,000.

(Figure 2 follows:)

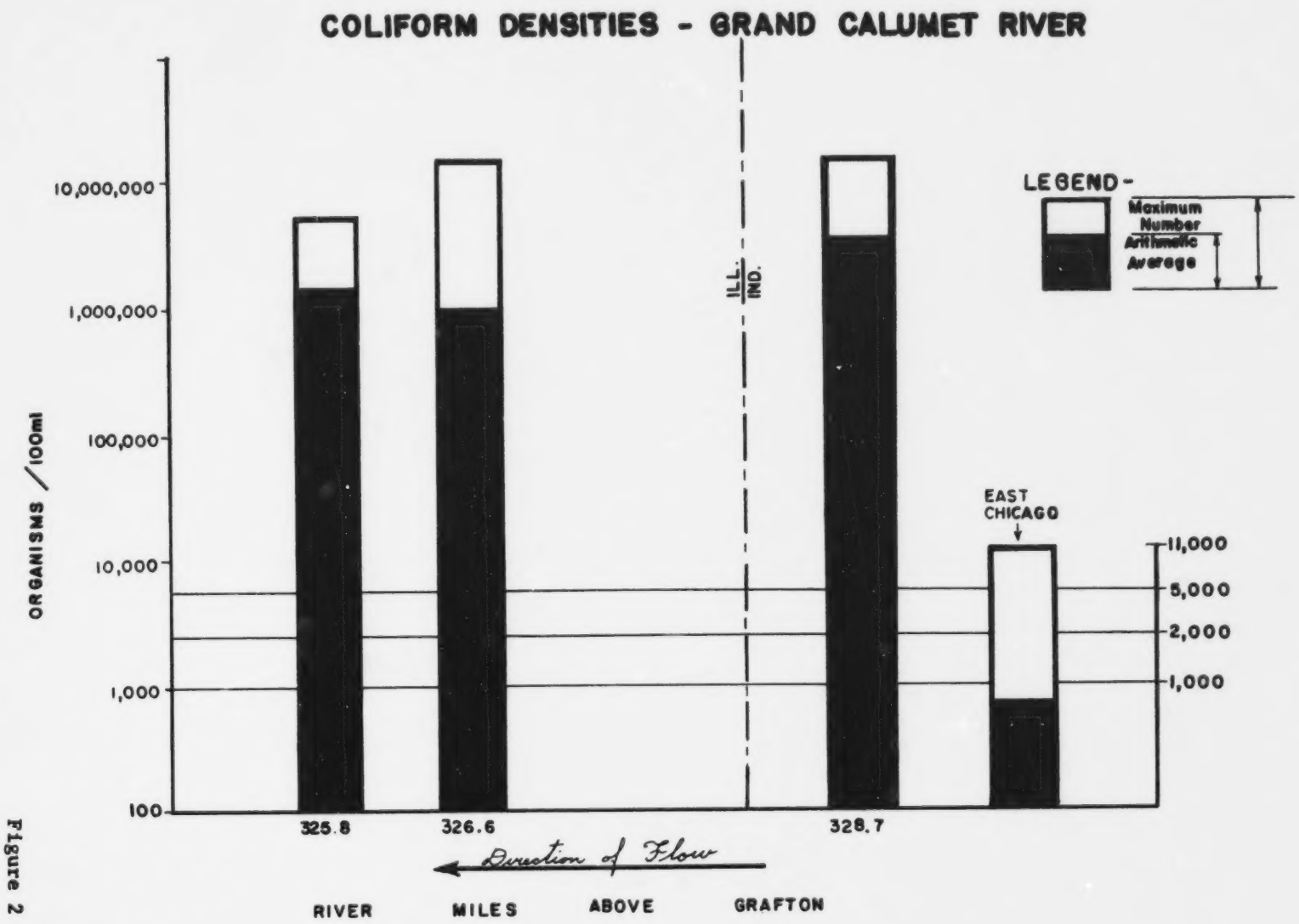
COLIFORM DENSITIES - GRAND CALUMET RIVER
ORGANISMS /100ml
10,000,000
1,000,000
100,000
10,000
1,000
100
ILL.
IND.
LEGEND -
Maximum Number
Arithmetic Average
EAST CHICAGO
11,000
5,000
2,000
1,000
325.8
326.6
328.7
Direction of Flow
RIVER MILES ABOVE GRAFTON

Figure 2

Cornell A. Leahu

Slide 3, please.

Figure 3 was prepared employing data in Figure VIII-5 of the HEW report. Figure 3 compares five-day BOD averages for the Grand Calumet River in milligrams per liter.

East Chicago is again shown on the extreme right with less than ten.

(Figure 3 follows:)

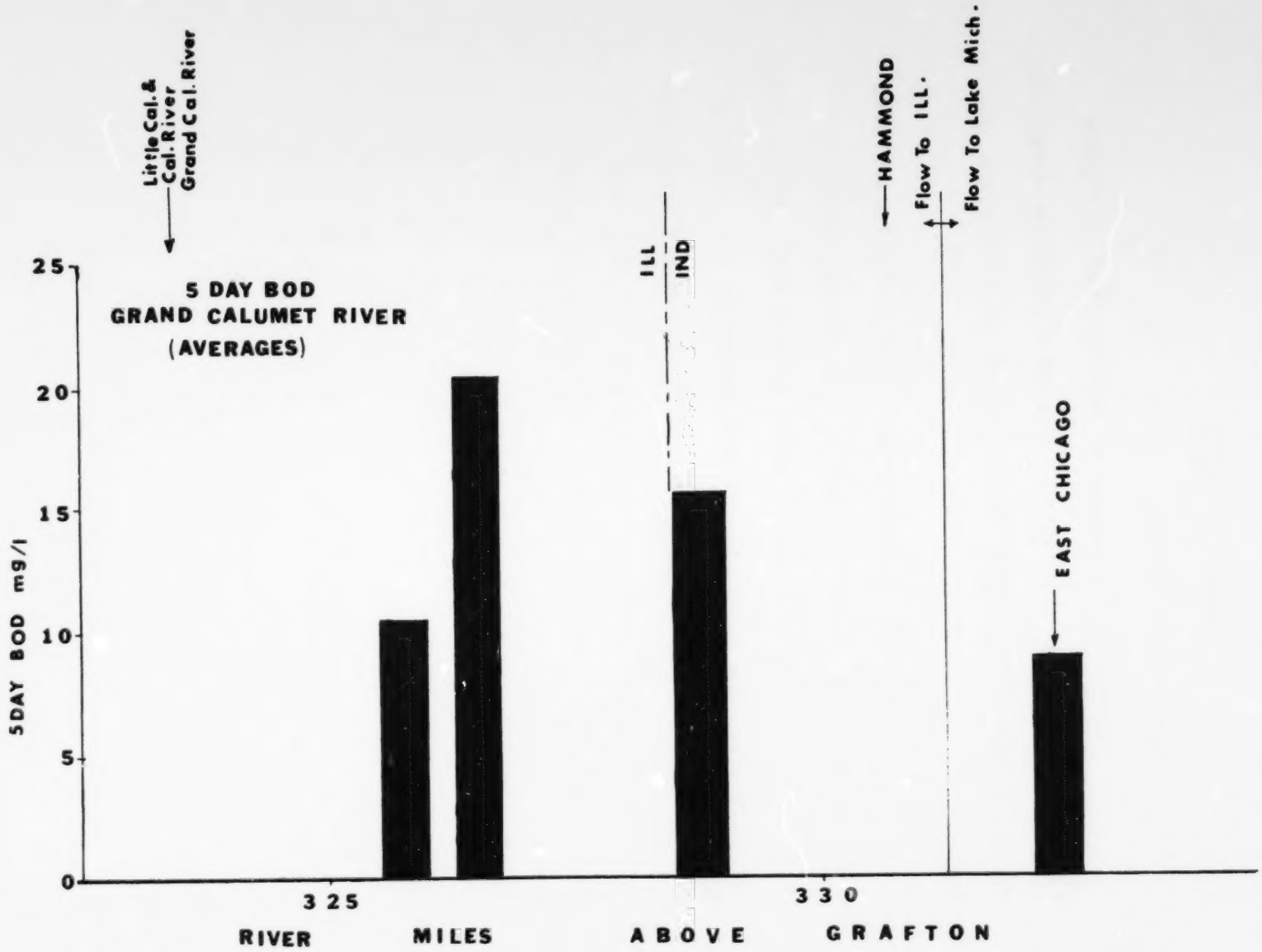
5 DAY BOD
GRAND CALUMET RIVER
(AVERAGES)
Little Cal. &
Cal. River
Grand Cal. River
ILL
IND
HAMMOND
Flow To ILL.
Flow To Lake Mich.
EAST CHICAGO
5DAY BOD mg/l
25
20
15
10
5
0
325
330
RIVER MILES ABOVE GRAFTON

Figure 3

Cornell A. Leahu

Next slide, please.

Figure 4 was prepared employing data in Figure VIII-7, also of the HEW report. Figure 4 compares dissolved oxygen values in the Grand Calumet River in milligrams per liter.

I will have to apologize. With the rapidity with which we made the slide I forgot to put in the values for East Chicago. You will notice East Chicago has a broken line, and on the extreme left the maximum number is one. On the extreme right, East Chicago average DO values are 6.1. This is at the point of outfall. The minimum is 4.4. That is the low minimum. The arithmetical average would be 6.1.

(Figure 4 follows:)

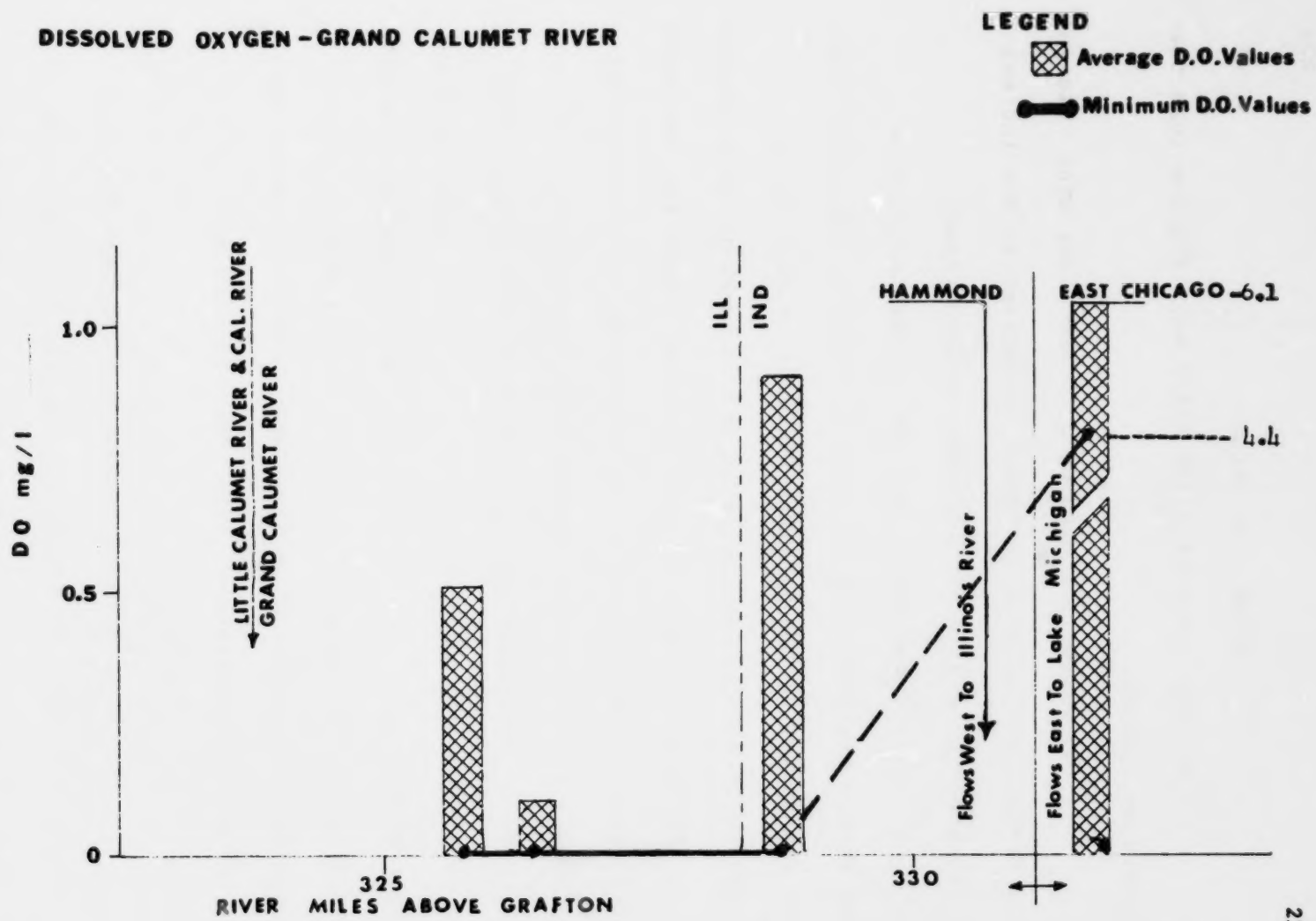
DISSOLVED OXYGEN - GRAND CALUMET RIVER
LEGEND
Average D.O. Values
Minimum D.O. Values
DO mg/l
1.0
0.5
0
LITTLE CALUMET RIVER & CAL. RIVER
GRAND CALUMET RIVER
ILL
IND
HAMMOND
EAST CHICAGO
6.1
4.4
Flows West To Illinois River
Flows East To Lake Michigan
325
330
RIVER MILES ABOVE GRAFTON

Figure 4

Cornell A. Leahu

We have one more slide later on. You can turn the lights on, please.

The values for Figures 2, 3 and 4 for East Chicago are drawn from the monthly reports submitted to the Indiana State Board of Health and included in this report.

During the March 1965 HEW Chicago conference our Mayor, the Honorable Dr. John B. Nicosia, announced that the new policy of the Sanitary District of East Chicago would be to invite industries in East Chicago to work jointly with the Sanitary District in a combined effort for treatment of industrial wastes. This invitation was recognition that municipal waste treatment can no longer be considered only in terms of treatment domestic wastes if that municipality is to attract and hold industries. Our Mayor perceived that the availability, use, and re-use of water promotes or stunts the growth of a community. Bearing this in mind he also recognized the possibility that some industrial wastes are better suited to treatment when combined with municipal sewage.

Following this conference the Sanitary District initiated a program of systematic testing and evaluation of certain industrial wastes. As a direct outcome of this testing the Sanitary District proposed to accept industrial wastes under certain conditions:

1. That the wastes are amenable to treatment in the District sewage treatment plant;

2. That the District can treat the wastes at less cost than if the industry treated these wastes;

3. That the wastes do not interfere with the sewers, treatment plant or other District appurtenances;

4. That the industry discharging the wastes shall pay for the added cost of treating these wastes.

With this new policy the District invited representatives from the oil, chemical and steel industries to act as an industrial technical advisory committee. This committee has been actively engaged in recommending an industrial waste ordinance, appraising the kinds of waste which could best be treated in the District plant, advising on analytical techniques and assisting in laboratory work to evaluate the possibilities for treating wastes and making the District facilities more effective. The committee has worked with the consulting engineer retained by the District, Dr. C. Fred Gurnham, and jointly have been of invaluable assistance to the District.

Initial attention in the testing and evaluation was given to phenolic type wastes which have created taste and odor problems at public water intakes. The General American Transportation Corporation tank car cleaning

operations effluent (Exhibit 2)-- I will have to digress here a minute. We did have slides on this regarding General American, but the size of the slide was different from the others. They are in the report. There are photographs, and there is complete data on them.

(Exhibit 2 follows. Photograph not reproduced.)

GENERAL AMERICAN TRANSPORTATION CORPORATION (GATX)
PLANT No. 2 (Railroad Avenue, East Chicago, Indiana) WASTE

The waste from this repair and maintenance shop is produced by draining and cleaning tank cars. Its composition is quite complex; but, fortunately, its daily volume is low -- usually between less than 20,000 to a maximum of about 36,000 gallons per eight hours (i.e. a rate of 80 gals/min. or less for 5 shifts/week). The primary treatment plant was designed for 50,000 gals/day. Its operation, started in 1950, was described in a report presented at the March, 1965 HWE Conference in Chicago. Briefly, it comprises lagooning, mechanical oil separation, equalization (30,000 gallons capacity holding tanks), neutralization, presettling, flocculation-adsorption (aluminum sulfate coagulant), and finally clarification in an INFILCO "Accelator" solids contact device (Fig. 1). Until mid-1965, the effluent had been discharged into the Indiana Harbor Canal.

Following the March, 1965, HWE Chicago conference, a program of systematic testing and evaluation was initiated. The equipment and operation of the treatment plant were improved (repairing all appliances, including the reagent feeding devices, and replacing defective piping, valves, etc.). New instrumentation was installed for automatic pH control and automated continuous sampling proportional to the flow rate.*(Fig. 2)

The characteristics of the effluent from the primary treatment system, before reaching the East Chicago sewers, are shown in the attached TABLE.

After cooperation with the administration of the East Chicago Sanitary District had been established and the question examined during several conferences, it was concluded that this effluent, after dilution by city sewage, could be accepted by the municipal plant for secondary treatment.

Consequently, on June 29, 1965, the outlet to the Indiana Harbor Canal was closed, and discharge of the pretreated waste into the sewers of the City of East Chicago was started, and successfully continued for the last six months of 1965, without interfering with the operation of the municipal sewage works.

G. Gutzeit

GG/bjs
12/13/65
Attachments

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* The cost of the original treatment system (1950) was $57,000. Expenses for improvements and new instrumentation in 1965 amounted to over $10,000.

Figure 1

Left to right: Presettling tank, sulfuric acid storage tank and feeding pump (automatically controlled by pH instrument), INFILCO "Accelator" solids contact clarifier.

Background: Treatment building, containing storage tanks and feeding pumps for reagents (lime slurry and aluminum sulfate solution), proportional sampler, magnetic flow-meter, pH meter and pH controls, laboratory equipment, etc.

Figure 2

Left to right: control panel (MINNEAPOLIS-HONEYWELL), proportional sampler (INFILCO), magnetic flow meter (FISHER & PORTER), pH meter (FOXBORO), reagent control valves (FOXBORO).

Pollution Load of Effluent
from General American Transportation Corporation's
Plant No. 2 Primary Treatment System

	Discharge MGD	COD(1)	Oil(2)	Phenolics	Suspended Solids	Total Nitrogen	Ammonia Nitrogen	Cyanide	pH
Maximum in ppm (mg/l)	0.036	3790	240	46	28	84	14	0.2	9.68
Minimum in ppm (mg/l)	0.015	1870	45	14	270	57	14	0.0	6.75
Average in ppm (mg/l)	0.020	2760	121	26	98	70.5	14	< 0.01	7.84
Average in Lbs/MG(3)	--	23032.2	1010.7	217.0	817.8	588.3	116.8	< 0.083	--
Average load in lbs. per 24 hr. work day, 5 days/wk.(4)	--	115.16	5.05	1.09	4.09	2.94	0.58	< 0.0004	--

(1) Dichromate oxidation (reflux) with silver catalyst.
(2) Chloroform extractables.
(3) ppm x 8.345 = lbs./million gallons (MG).
(4) Lbs./MG x Discharge in MGD x 8/24 hours.

GG/bjs
12/13/65

Cornell A. Leahu

The General American Transportation Corporation tank car cleaning operations effluent, after testing and evaluation, was found to be amenable to treatment by the District treatment plant and consequently, on June 29, 1965, less than four months after the HEW hearing, the outlet to the Indiana Harbor Canal was closed and discharge of the pretreated waste into the sewers of the District was started, and successfully continued for the last six months of 1965. Expenses incurred by General American for improvements and new instrumentation in 1965 amounted to over $10,000. The Youngstown Sheet and Tube Company and Inland Steel Company ammonia still wastes of the coke plant operation (the principal source of phenolics) were also tested and evaluated.

The studies have shown that the District treatment plant destroys the phenolics and cyanides. As would be expected, the additional wastes are causing some changes in plant operation, but the wastes are being treated. We expect that as other wastes are added, future changes may be required. Added costs, due to the changes in treatment, are to be borne by the companies.

The District has reached agreement with Youngstown and Inland on the controls required for discharge of the coke plant ammonia still waste to District sewers for treat-

ment at the District plant. These controls, as well as the conditions for acceptance of the wastes and the stipulations on payment for treatment, are defined in a written contract between the Mayor, the Board of Sanitary Commissioners, and the companies. Contracts have been signed by Youngstown Sheet and Tube Company and Inland Steel Company. Similar contracts are being developed with other industries.

Industrial Water Supply

As part of the East Chicago Sanitary District program, plans are being developed to answer still another need of industry -- supply of industrial service water for industries located away from the lake.

Next slide, please.

The District is determining the possibilities of processing sewage treatment plant effluent combined with treated stormwater to provide water of a quality suitable for industrial requirements. The advantages are obvious. The economics and assurance of quality control are currently being defined. Such a facility would provide better than tertiary treatment of wastewater and provide a positive economic benefit.

Next slide, please.

This (Exhibit 3) is a flow diagram of the proposed plant. The raw water comes in at the extreme left into two

densators, which is chemical treatment by lime softeners, into a stabilization tank, and then into the filtration, which is Greenleaf rapid sand filters, then into storage for pumps and pump well, into final chlorination, and into re-cycling for industrial re-use.

By the way, for the conferees we have plans and specifications on this.

(Exhibit 3 follows:)

WASTEWATER TREATMENT PLANT
(FLOW DIAGRAM)

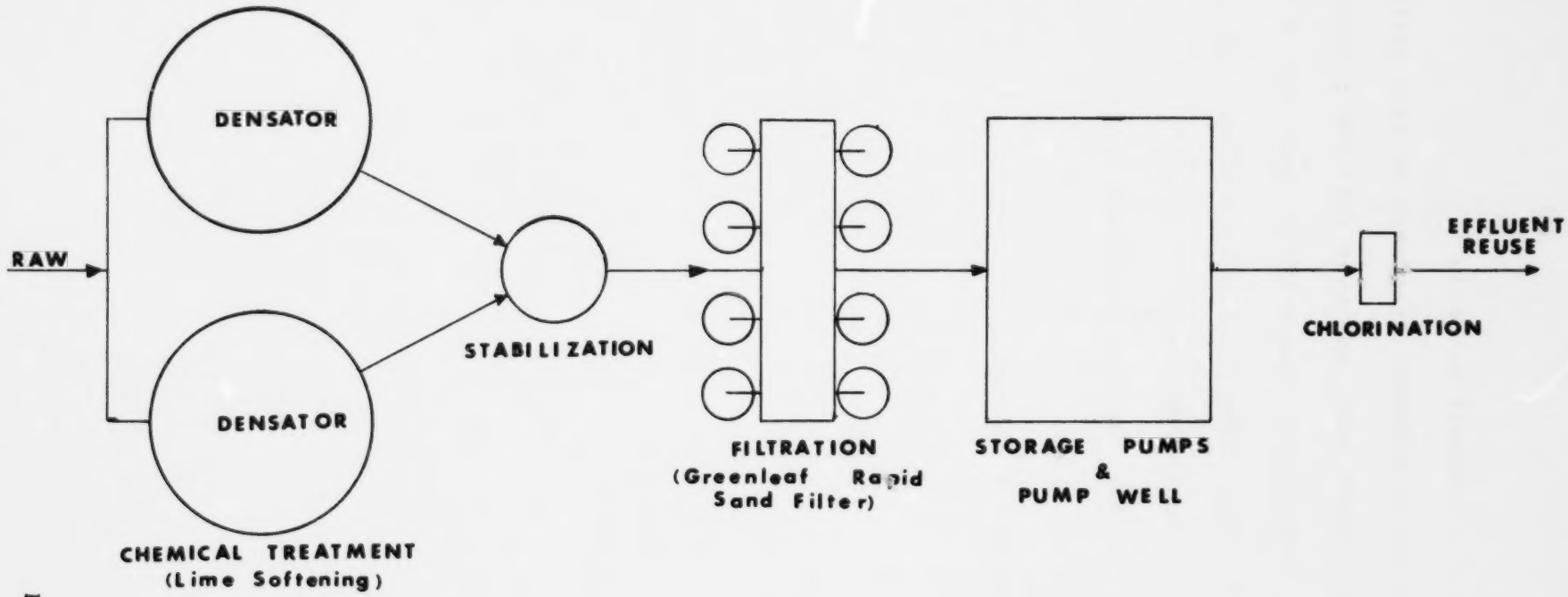


Exhibit 3

Cornell A. Leahu

Combined Sewer Discharges

The City of East Chicago has a combined sewer system which it would be economically prohibitive to separate. Although there is general agreement that separate sewers should be provided in future area development, there is no strong opinion that separation of existing combined sewers would be economically or even practically desirable. The HEW Detroit River report containing data on the separate storm discharges in Ann Arbor did not suggest such water as being suitable for discharge without treatment.

The East Chicago Sanitary District is proposing a full-scale plant study on handling combined storm and sanitary sewer surcharges. The plan calls for primary settling of sewage solids and then a series of treatments in a large earthen bank basin. Since the District has land available, such a proposal would be a least-cost opportunity. Excavation is presently in progress.

Under the Water Pollution Control Amendment of 1965 there are monies provided to promote pilot plant studies on combined sewer discharges. The District believes that its proposal offers new considerations worthy of public support.

Confusion in the Criteria of Quality

The City of Chicago Water Department informed the HEW conference last March that the water supply for Chicago should have certain characteristics.

Cornell A. Leahu

Combined Sewer Discharges

The State and Federal representatives agreed "to initiate a program of remedial action to protect water quality in the area for the maximum number of legitimate uses, the conferees will use (these recommendations) as a guide for water quality at the Chicago water intakes." (Recommendations such as this make one wonder if there is any sense in, for example, a dissolved oxygen minimum for water supply of 8 ppm; on this criterion should well waters -- usually devoid of dissolved oxygen be condemned?)

It should be noted that the only defense offered for these figures was the demand by Chicago. Neither the Federal agency nor the States offered guidelines as to the desired quality to protect the most beneficial uses for the area. The recommendation referred not to the relative importance but to the "greatest number of uses."

To augment the confusion, the conferees ordered all cities and industries to provide plans within six months for treatment facilities while simultaneously agreeing to set up a technical committee to "evaluate water quality criteria and related matters" and make recommendations within the same six months. (Why have criteria when the design is to be developed simultaneously? What is the basis for the design?)

Cornell A. Leahu

Such criteria (from the technical committee) would indicate the acceptability of water quality for specific uses. Analyses of the actual water quality would then determine the adequacy of the treatment facilities.

Until such criteria are adopted we can only surmise as to the adequacy of our treatment. As of the time this report was prepared, within the last four days, the East Chicago Sanitary District had not received any word of the proposed criteria. We can therefore offer no opinions at this time on the objectives of water quality. Since the new Federal law offers the States an opportunity to hold public hearings and adopt criteria, we assume that Indiana will be holding such hearings and that we will have an opportunity to express ourselves if we so desire.

Even though there has been no report available from the technical committee, we have been informed of the difficulties of various qualified laboratories in trying to reach agreement on analytical results. If the best laboratories cannot agree on the results of the analyses of a sample, will the less qualified laboratories be reporting accurately?

There are also reports that some of the concentrations being considered are below the sensitivity of the standard methods used in water and wastewater plants. Any

proposals for limits below the range of the analytical method or outside the scope of accuracy or reproducibility of results will, I certainly hope, carry some justification of necessity or else there will be little incentive to run such analyses.

Thank you.

MR. STEIN: Thank you.

Are there any comments or questions?

(No response.)

If not, thank you very much.

Mayor?

MAYOR NICOSIA: Any questions?

MR. STEIN: Well, we really appreciate your views and continuing interest in water pollution. I know that Dr. Nicosia has been very, very interested in this problem. While there may be differences in approach, as long as we are all willing to go ahead and deal with the problem of getting as clean water as possible I am sure we are going to achieve the ends.

We appreciate the views of Dr. Nicosia and East Chicago. Many of the points of view they express, at least to me, are very stimulating. We like to have constructive critics as we have in your District. Thank you very much.

MAYOR NICOSIA: Thank you very much.

Mayor John B. Nicosia

The only comment I would like to make is you understand that we have made tremendous progress in the last six months since the last meeting, since the first meeting. We seem to be stymied because progress as far as abatement of water pollution costs money, and we have just got to get some money.

I think you are going to be the key for us to progress in our city. Otherwise this is just, "We had one heck of a ball here today."

I hope in the very near future, Murray, I am going to knock on your door, because I have some definite plans that I think you are going to be very interested in. And I think you had better just get that famous little key out and open up that safe and say, "Here it is," because this is the only way we are going to be able to do anything in our city.

Digging a ditch isn't going to do the job. Taking a half-million gallons of still waste from one industry and half-a-million gallons from another one is just a drop in the bucket. We have a long way to go.

We feel that we have the solution. We feel it because we have convinced the Federal government that our solution is one that is going to do the job and maybe is going to set up a precedent for the rest of the country. But you must give us that money. And it isn't a heck of a lot

either.

MR. STEIN: I hear you. As you know, we are very sympathetic to that. Our door is always open. I don't know that we always have money in the safe.

We do know that in the Act we have had an authorization and were appropriated money of $20,000,000 for the next four years. We got the first $20,000,000 for concentrating on storm water problems. We have an additional $50,000,000 authorization for municipal waste treatment facilities. Of course, these can treat industrial wastes.

I think the Mayor has put his finger on one of the areas or one of the aspects of the Federal program that I think has been overlooked. That is, we can make a grant to a municipality to treat both municipal and industrial wastes.

Very often the question is asked as to why we don't have a financial aid program for industry. The point is we do -- if the industry will join with the municipality and the municipality will own the facility.

This is one thing that has always puzzled me in the field. It seems to me that once a municipality accepts the wastes in its sewers from an industry the municipality assumes a legal and technical responsibility for treating the wastes. It also seems to me that this would be attractive in industry. All you have to do is come to an

arrangement with the city, make the connection, and from there on the problem with the "pesty" -- is that the word? -- State officials and the worse Federal official is one the city has to handle and not the industry.

Also, as I said, there is Federal financial assistance to the cities, and this is an aspect of the Federal program that should be considered.

MR. KLASSEN: It sounds like a lawyer and chamber of commerce approach.

COLONEL CHESROW: Mr. Chairman, I would like to take this opportunity to commend Dr. Nicosia. Dr. Nicosia is a professional physician who gave up a very lucrative practice to carry on on a problem that has plagued the area that he represents.

Since he has become Mayor of East Chicago, he has done a tremendous job.

Dr. Nicosia, congratulations on a job well done.

MAYOR NICOSIA: Thank you very much. I am trying to do a job that is there, and the problem faces everyone of us. Certainly we all have to work together. One calling the other different names certainly is not going to solve this particular problem.

This is a problem that is here. We know it. We recognize it. You remember we were in Detroit together not

too long ago on the same problem -- the whole Great Lakes. This is a problem that the whole country is becoming very, very aware of, and it is becoming alarming.

You know I said at that meeting I hoped some day 70 years from now that perhaps the good Lord might give me just about two hours to get out from where I am and just to come up and see if we still have any water left that is drinkable, potable water for our children's children.

We must remember we only have two natural resources. One is air, and the other one is water. Unconsciously we are destroying both.

You know you can't make water. What is here is here. You can transform it, you can pollute the heck out of it, but you can't make it. And the same thing with air.

We must wake up to the point where we must do something about it and really seriously and get the Federal government to help us. Because the small municipalities cannot carry the load. We must have some sort of a guideline, some sort of a formula to follow, and then we can solve this problem, because there is no problem in this wide world or this country that we cannot solve. It is just a question of initiative and monies.

Thank you.

MR. STEIN: Thank you.

Mayor John B. Nicosia

MR. KLASSEN: If I remain silent, it might be considered that I agree with everything that Dr. Nicosia said. I don't. I don't believe -- and this is a personal opinion -- that any water pollution program in any State or for any municipality should be geared to or depend upon getting money from somebody else.

I think it is fine if they get a Federal grant, but so far as Illinois is concerned we expect them to do the job whether or not they get any Federal money.

I just wanted to clear up that point and not leave the impression that all water pollution control for municipalities and industry should be geared to a Federal grant, getting money from somebody else. It is a local responsibility basically.

MR. STEIN: Mr. Poston.

MR. POSTON: I note that Mr. Leahu did not have a copy of the technical committee's report, and I would like to ask Mr. Johnson to make sure that he has a copy right now. Would you take care of that?

MR. JOHNSON: Yes.

MR. STEIN: Mr. Leahu, I assume you want this entire report to go in the record as if read. Is that correct?

MAYOR NICOSIA: I certainly do. And I hope you look at it and not leave it on the shelf.

Mayor John B. Nicosia

MR. STEIN: We will look at it. We will make a fair trade. You read the technical report.

But I want to indicate that we may have some difficulty in the reproduction of the charts and the inserts and the pictures. If this is so, we will put the text in and make a reference to where copies of this can be had. If we have smaller pictures we can do it.

Off the record.

(Discussion off the record.)

(The balance of the East Chicago-Indiana presentation follows. Photographs and large plant layout diagram not reproduced.)

REPORT ON
TREATMENT PROCESS PRIOR TO DISCHARGE INTO THE WATERS OF THE GRAND CALUMET RIVER, LITTLE CALUMET RIVER, LAKE MICHIGAN, AND THEIR TRIBUTARIES

EAST CHICAGO SANITARY DISTRICT

HONORABLE DR. JOHN B. NICOSIA, MAYOR

CORNEL A. LEAHU, SUPERINTENDENT

BOARD OF SANITARY COMMISSIONERS

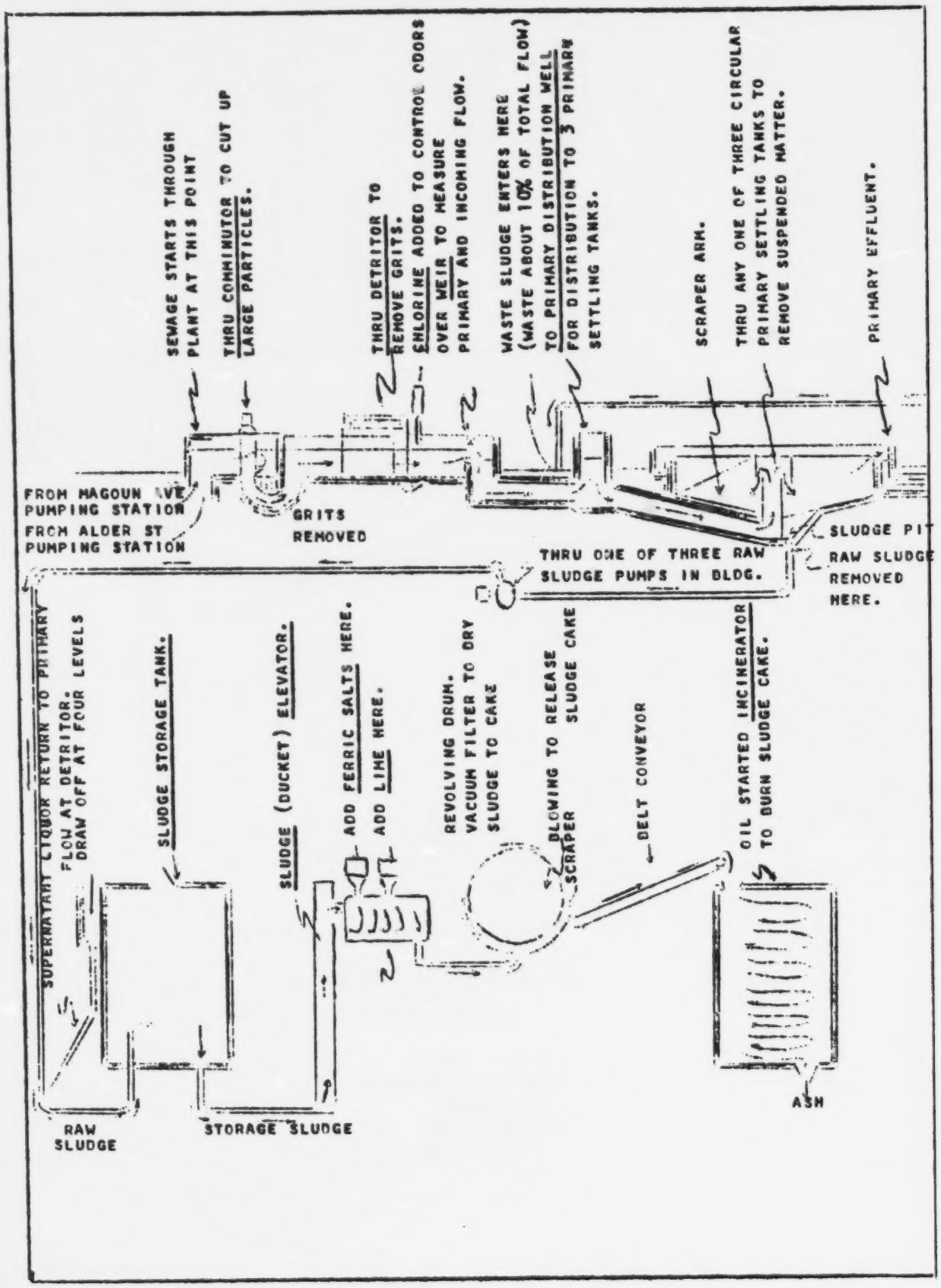
PETER E. AUKSEL	PRESIDENT
A. G. GIANNINI, P. E.	VICE-PRESIDENT
ZARKO SEKEREZ, P. E.	SECRETARY

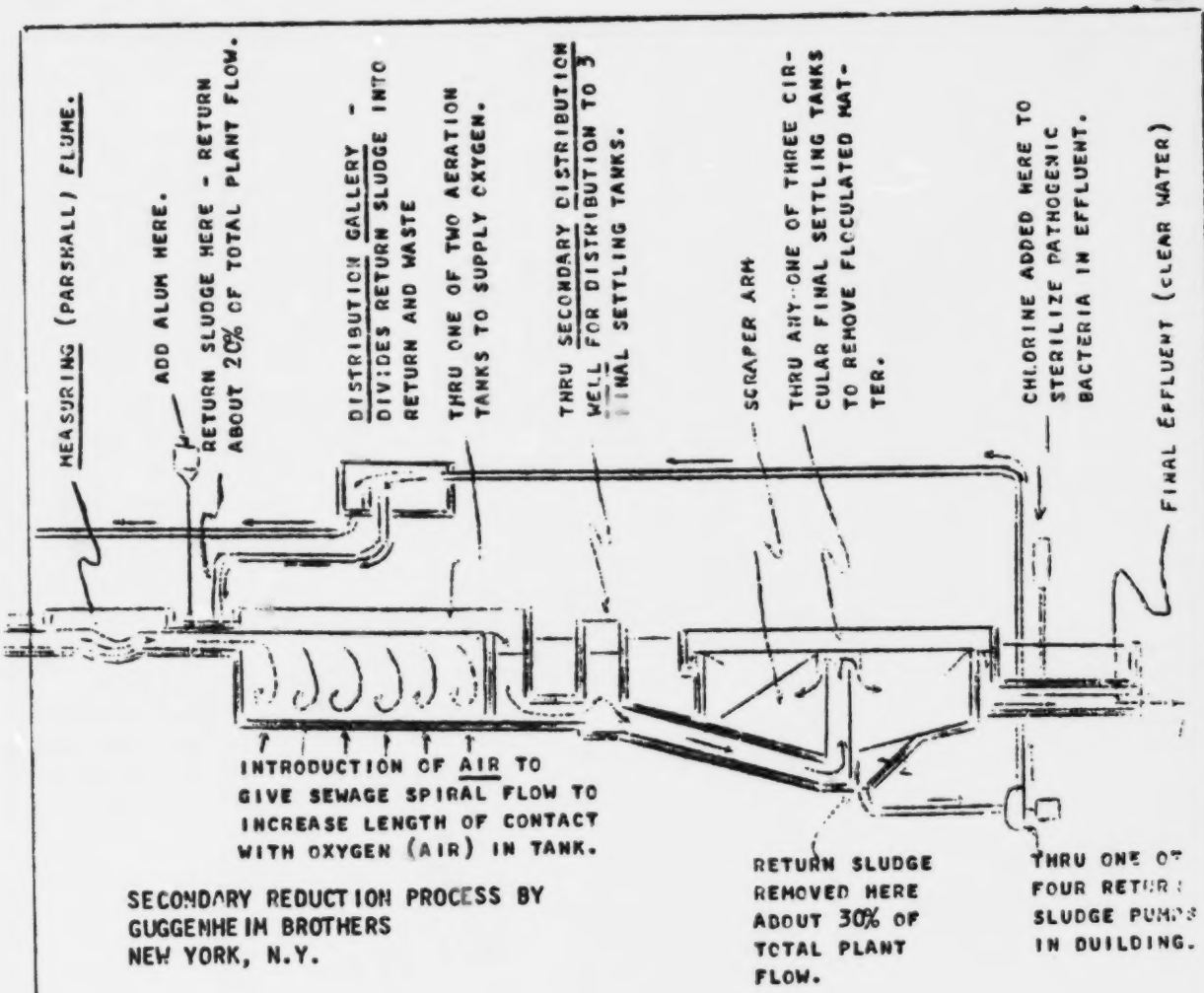
PLANT DESIGN INFORMATION

ENGINEER	RUSSELL B. MOORE
CONTRACT OF COST	$2,277.199.87
TYPE OF TREATMENT	GUGGENHEIM BIOCHEMICAL
DATE PLANT STARTED	MAY, 1945
DESIGN POPULATION	64,800
TYPE OF SEWERAGE SYSTEM	COMBINED
DESIGN FLOW (MILLION GALLONS PER DAY)	20.0
DESIGN MAXIMUM HOURLY RATE (MILLION GALLONS)	30.0
DESIGN STRENGTH OF RAW SEWAGE	150
INDUSTRIAL WASTES	OIL, PICKLING LIQUOR
PRIMARY SETTLING TANKS	320,000
DESIGN RATE * PRIMARY DETENTION PERIOD IN HOURS	1.15
AERATION UNITS (4) CAPACITY OF EACH IN GALLONS	509,000
DESIGN RATE - AERATION DETENTION PERIOD IN HOURS - 20% RETURN SLUDGE	2.04
FINAL SETTLING TANKS (3) CAPACITY OF EACH IN GALLONS	407,000
DESIGN RATE - FINAL DETENTION PERIOD IN HOURS	1.7
FINAL WEIR LENGTH IN FEET	942

DIGESTION TANK DATA

EQUIVALENT POPULATION SUSPENDED SOLID BASIS	100,000
SUSPENDED SOLIDS RAW SEWAGE / DAY	20,000 LBS.
SUSPENDED SOLIDS REMOVED / DAY	19,200 LBS.
VOLUME SOLIDS TO DIGESTERS / DAY	14,400 LBS.
VOLUME REQUIRED @ 25 CU. FT. /LBS. VOLATILE ADDED / DAY	360,000 CU. FT.
CU. FT. / EQUIVALENT POPULATION	3.6
VOLUME STORAGE TANK	370,000 CU. FT.


SEWAGE STARTS THROUGH PLANT AT THIS POINT
THRU COMMINUTOR TO CUT UP LARGE PARTICLES.
THRU DETRITOR TO REMOVE GRITS.
CHLORINE ADDED TO CONTROL ODORS OVER WEIR TO MEASURE PRIMARY AND INCOMING FLOW.
WASTE SLUDGE ENTERS HERE (WASTE ABOUT 10% OF TOTAL FLOW) TO PRIMARY DISTRIBUTION WELL FOR DISTRIBUTION TO 3 PRIMARY SETTLING TANKS.
SCRAPER ARM.
THRU ANY ONE OF THREE CIRCULAR PRIMARY SETTLING TANKS TO REMOVE SUSPENDED MATTER.
PRIMARY EFFLUENT.
FROM MAGOUN AVE PUMPING STATION
FROM ALDER ST PUMPING STATION
GRITS REMOVED
SLUDGE PIT
RAW SLUDGE REMOVED HERE.
THRU ONE OF THREE RAW SLUDGE PUMPS IN BLDG.
SUPERNATANT LIQUOR RETURN TO PRIMARY
FLOW AT DETRITOR. DRAW OFF AT FOUR LEVELS
SLUDGE STORAGE TANK.
SLUDGE (BUCKET) ELEVATOR.
ADD FERRIC SALTS HERE.
ADD LIME HERE.
REVOLVING DRUM. VACUUM FILTER TO DRY SLUDGE TO CAKE
BLOWING TO RELEASE SLUDGE CAKE
SCRAPER
BELT CONVEYOR
OIL STARTED INCINERATOR TO BURN SLUDGE CAKE.
RAW SLUDGE
STORAGE SLUDGE
ASH



SCHEMATIC CROSS-SECTION OF
SEWAGE TREATMENT PLANT
EAST CHICAGO, INDIANA
HON. DR. JOHN B. NICOSIA
MAYOR
CORNEL A. LEAHU, SUPERINTENDENT

SANITARY DISTRICT BOARD
OF
COMMISSIONERS

PETER E. AUKSEL
AMERIGO G. GIANNINI
CARLOS BORGE
MARTIN A. KARR, ESQ.
ATTORNEY

STATISTICAL SUMMARY 1961-1962-1964-1965

	1961	1962	1964	1965
POPULATION SERVED (ESTIMATED)	64,800	64,800	64,800	57,000
SEWAGE TREATED, MILLION GALLONS	3,914.570	3,775.432	3,796.891	4,268.000
SEWAGE TREATED, MILLION GALLONS DAILY	10.710	10.342	10.402	11,700
SUSPENDED SOLIDS REMOVED, POUNDS	4,472,709	4,976.506	3,972.468	3,656,847
5-DAY BOD REMOVED, POUNDS	3,460,636	3,735,822	2,502,774	3,077,569
GRIT REMOVED CUBIC FEET	2,030	1,140	2,500	4,041
SCUM REMOVED, CUBIC FEET	1,129	1,360	1,946	2,940
REMOVAL OF SUSPENDED SOLIDS, PER CENT	94.2	96.4	94.7	91.4
REMOVAL OF BOD OXYGEN, PER CENT	86.0	87.9	87.6	91.1

DESCRIPTION OF TREATMENT PROCESS

STORM WATER AND SANITARY WASTES FLOW, BY GRAVITY, THROUGH A COMBINED SEWERAGE SYSTEM TO SEWAGE LIFT STATIONS LOCATED AT ALDER STREET IN THE CALUMET ADDITION TO INDIANA HARBOR, AND AT 151ST AND MAGOUN AVENUE IN EAST CHICAGO; THE ALDER STREET PUMPING STATION HANDLING ALL WASTES FROM THE INDIANA HARBOR - MARKTOWN - CALUMET SECTIONS OF EAST CHICAGO AND THE MAGOUN AVENUE PUMPING STATION HANDLING THE REMAINDER OF THE CITY'S WASTES. PUMPING STATIONS LOCATED AT BROAD AND SPRUCE STREETS IN MARKTOWN: CANAL STREET AND THE INDIANA HARBOR SHIP CANAL: MICHIGAN AND SHERIDAN AVENUE: SERVE AS RELAY STATIONS FOR THE ALDER STREET PUMPING STATION. MECHANICALLY CLEANED FIXED BAR SCREENS USED TO REMOVE FLOATING AND LARGE SUSPENDED SOLIDS ARE IN OPERATION AT BOTH PUMPING STATIONS. GRUENDLER SEWAGE SHREDDERS USED FOR SHREDDING SCREENINGS ARE ALSO IN OPERATION AT THE MAGOUN AVENUE PUMPING STATION.

IN ADDITION TO STORM WATER PUMPS, THE CITY OF EAST CHICAGO HAS IN OPERATION, THREE HORIZONTAL DUAL SPEED SEWAGE LIFT PUMPS, HAVING A COMBINED CAPACITY OF 28 MILLION GALLONS PER DAY AT 45' T.D.H., AT THE ALDER STREET STATION, AND THREE VERTICAL MOTOR DRIVEN, OPEN SHAFT, NON-CLOG SEWAGE PUMPS, HAVING A COMBINED CAPACITY OF APPROXIMATELY 15 MILLION GALLONS PER DAY AGAINST 38' TDD.H., AT THE MAGOUN AVENUE STATION. THESE PUMPS LIFT THE SEWAGE AND PASS IT THROUGH FORCE MAINS TO THE SEWAGE TREATMENT PLANT AT 152ND. AND INDIANAPOLIS BOULEVARD.

INDUSTRIAL-SANITARY WASTES, UPON ENTERING THE SEWAGE TREATMENT PLANT, FIRST PASS THROUGH TWO CHICAGO COMMINUTORS; EACH WITH A CAPACITY OF 20 MILLION GALLONS DAILY. THESE UNITS SHRED LARGE PARTICLES MAKING THE CHARACTER OF SEWAGE MORE CONSISTENT AND PREVENTING THE CLOGGING OF THE NUMEROUS PIPE LINES, PUMPS, AND OTHER MECHANICAL EQUIPMENT LOCATED IN THE TREATMENT PLANT. IN THE EVENT OF EMERGENCY THE SEWAGE CAN BY-PASS THIS STAGE OF THE TREATMENT PROCESS, FLOWING THROUGH A MANUALLY CLEANED FIXED BAR SCREEN. AFTER TREATMENT, BY THE COMMINUTORS, THE SEWAGE PASSES INTO A 30 FOOT SQUARE DORR DETRITOR WHICH REMOVES THE HEAVIER INORGANIC SOLIDS. THE SEWAGE THEN PASSES THROUGH A 60-INCH PIPE TO THE PRIMARY DISTRIBUTION WELL AND TO THREE DORR PRIMARY SETTLING TANKS. THESE TANKS ARE DESIGNED TO RETAIN THE SEWAGE FOR 1.5 HOURS; EACH HAVING A CAPACITY OF 320,000 GALLONS. THE EFFLUENT FROM THESE TANKS THEN PROCEEDS TO FOUR AERATION TANKS; EACH WITH A CAPACITY OF 509,000 GALLONS. THE AERATORS SUPPLY AIR AT THE RATE OF 3,470 CUBIC FEET PER MINUTE AND RETAIN THE SEWAGE FOR TWO AND A HALF HOURS. IT IS AT THIS POINT THAT THE DESIGN CALLS FOR THE APPLICATION OF SECONDARY RETURN SLUDGE IN AN AMOUNT OF 20 PERCENT OF THE VOLUME OF FLOW AND INTRODUCTION OF ALUMINUM SULFATE (ALUM) AT THE RATE OF .4 GRAINS PER GALLON.

The aerated sewage then proceeds to the three final settling tanks, each with a capacity of 470,000 gallons, where it is detained for 1.7 hours. The finished effluent is then disinfected and discharged into the grand Calumet River:

Plant equipment includes a pair of Wallace and Tiernan chlorinators that are used to chlorinate the final effluent.

Sludge, from the primary tanks, is drawn off into two primary sludge digesters; a fixed cover Dorr-Oliver and a floating cover Pacific flush tank. Digested sludge is transferred daily to 2 Pacific flush tank company secondary digesters. Digested sludge is treated with ferric chloride and lime, and vacuum filtered on two, 8' diameter-10' length, emico filters.

The dewatered sludge is then conveyed to a nichols multiple hearth incinerator for final destruction. This incinerator has a capacity of reducing 1,750 pounds of dry solids per hour and will destroy sludge with a moisture content as high as 75 percent. All sludge from the secondary tanks returns to some point in the plant process. Chicago scru-peller pumps move part to the aeration tanks, and part to the primary tanks where it is withdrawn with the primary sludge.

The plant originally was intended to be constructed out of WPA funds, with a contractor retained for supervision and furnishing equipment. However, before construction was complete, this WPA support was withdrawn, and the city was faced with the extremely difficult task of completing construction in the face of wartime restrictions and man-power shortages. The plant has been in full operation since about the 1st of June, 1945.

TABLE 1

METEROLOGICAL DATA

MONTHS	RAINFALL INCHES (1) RECORDED	NORMAL	MEAN AIR (1) TEMP.	DEPARTURE	MAXIMUM AND MINIMUM MAX	MIN	N	NE	NW	S	SE	SW	E	W
JANUARY	4.09	1.86	24.5	-1.5	63	-9	-	4	5	7	1	5	-	9
FEBRUARY	1.76	1.60	27.4	-0.3	59	-9	4	4	2	8	1	6	-	3
MARCH	3.44	2.74	30.2	-6.1	60	8.	6	5	4	1	3	5	1	6
APRIL	4.21	3.04	47.7	-1.3	78	29	7	4	4	-	3	5	4	3
MAY	1.47	3.73	64.0	4.0	85	37	1	6	1	5	1	12	2	3
JUNE	2.89	4.07	68.9	-1.6	94	48	4	13	0	3	1	5	2	2
JULY	----	----	----	----	--	--	-	-	-	-	-	-	-	-
AUGUST	679	3.16	70.3	-3.9	92	43	2	3	5	6	2	7	3	3
SEPTEMBER	6.21	2.73	65.0	-1.1	89	40	2	3	1	9	1	5	4	5
OCTOBER	1.06	2.78	54.0	-1.1	84	30	3	4	5	8	-	7	1	3
NOVEMBER	1.10	2.20	42.0	2.1	74	18	4	-	3	3	4	5	-	11
TOTAL	33.02	27.91	494.0		778	+235	35	46	30	50	17	62	17	48
AVERAGE	3.30	2.79	49.4		78	+23.5	3.5	4.6	3.0	5.0	1.7	6.2	1.7	4.8

(1) FROM U. S. WEATHER BUREAU DATA

TABLE 2

SEWAGE FLOW - WATER WORKS PUMPAGE

AND

SOLIDS MATTER REMOVED FROM SEWAGE

MONTHS	SEWAGE FLOW M.G.D.	WATER WORKS PUMPAGE M.G.D. (1)	SEWAGE FLOW GAL. CAPITA	POUNDS SUSPENDED SOLIDS REMOVED DURING THE MONTH (2) TOTAL	VOLATILE	PRIMARY DETENTION PERIOD IN HOURS (3)
DECEMBER 1964	10.200	14.942	179	319,114	223,380	2.3
JANUARY	11.900	14.505	209	273,823	202,629	2.0
FEBRUARY	12.000	14.166	211	252,196	168,971	2.0
MARCH	13.000	12.385	228	457,095	301,683	1.7
APRIL	13.400	12.993	235	439,200	289,872	1.8
MAY	12.000	13.596	211	307.807	206,231	1.9
JUNE	10.600	17.340	186	273,600	199,728	1.8
JULY	10.400	19.132	182	240,566	163,581	2.9
AUGUST	11.500	18.818	202	273,544	202,423	2.0
SEPTEMBER	12.800	17.104	225	242,700	194,339	1.8
OCTOBER	11.700	15.662	205	314,588	245,379	2.0
NOVEMBER	10.900	15.239	191	242,700	150,474	2.1
TOTAL	140.400	185.882	2464	3,656,847	2,548,690	24.3
AVERAGE	11.700	15.490	205	304,737	212,391	2.0

(1) FROM THE EAST CHICAGO WATER DEPARTMENT
(2) COMPUTED FROM SUSPENDED SOLIDS DETERMINATIONS OF RAW SEWAGE AND FINAL EFFLUENT. POUNDS VOLATILE COMPUTED BY USING PER CENT VOLATILE OF RAW SEWAGE.
(3) WASTE SLUDGE INCLUDED IN COMPUTING PRIMARY DETENTION PERIOD.

TABLE 3

MONTHS	TOTAL LBS. SUSPENDED SOLIDS IN RAW SEWAGE	POUNDS SUSPENDED SOLIDS PER CAPITA DAILY	POUNDS B. O. D. PER CAPITA DAILY	POPULATION EQUIVALENT .17 POUNDS BOD/CAP/DAY	AVERAGE TEMP. DEGREES FAHRENH.
DECEMBER 1964	337,559	0.19	0.170	57,047	57
JANUARY	307,675	0.17	0.210	70,058	51
FEBRUARY	294,224	0.18	0.210	68,876	52
MARCH	507,501	0.29	0.270	91,835	51
APRIL	469,380	0.27	0.240	82,176	54
MAY	339,090	0.18	0.150	49,858	60
JUNE	289,530	0.17	0.110	38,017	65
JULY	261,981	0.15	0.100	34,405	70
AUGUST	291,369	0.16	0.100	34,976	71
SEPTEMBER	285,030	0.17	0.120	41,447	70
OCTOBER	338,799	0.19	0.140	48,217	67
NOVEMBER	272,700	0.16	0.130	43,311	63
TOTAL	3,994,833	2.28	0.195	660,223	731
AVERAGE	332,903	0.19	0.160	55,018	61

TABLE 4

SETTLEABLE SOLIDS

MONTHS	RAW SEWAGE C.C.	PRIMARY EFFLUENT C.C.	PERCENT REMOVAL CLARIFIED TO RAW	FINAL EFFLUENT C.C.	PERCENT REMOVAL FINAL TO RAW
DECEMBER 1964	1.6	0.5	68.7	.005	99.9
JANUARY	2.3	0.4	82.6	.005	99.8
FEBRUARY	5.1	0.6	90.0	.005	99.9
MARCH	4.5	2.2	51.1	.005	99.9
APRIL	5.8	3.4	41.4	.005	99.9
MAY	3.3	0.4	87.8	.005	99.9
JUNE	3.6	0.5	86.1	.005	99.9
JULY	3.5	0.5	85.7	.005	99.9
AUGUST	2.4	0.4	83.3	.005	99.9
SEPTEMBER	2.6	0.5	80.8	.005	99.9
OCTOBER	4.1	0.5	87.8	.005	99.9
NOVEMBER	2.9	0.5	82.8	.005	99.9
TOTAL	41.7	10.4	928.1	.060	1198.0
AVERAGE	3.5	0.9	77.3	.005	99.8

TABLE 5

SUSPENDED SOLIDS AND PER CENT REMOVAL

MONTHS	RAW SEWAGE P.P.M.	PRIMARY EFFLUENT P.P.M.	PERCENT REMOVAL PRIMARY TO RAW	FINAL EFFLUENT P.P.M.	PERCENT REMOVAL COMPLETE TREATMENT
DECEMBER 1954	128	51	60	7	94.5
JANUARY	100	48	52	11	89.0
FEBRUARY	105	57	46	15	85.7
MARCH	151	115	24	15	90.1
APRIL	140	109	22	9	93.6
MAY	102	46	55	10	90.2
JUNE	109	44	60	6	94.5
JULY	98	52	47	8	91.8
AUGUST	99	34	66	6	93.9
SEPTEMBER	89	43	52	7	92.1
OCTOBER	112	40	64	8	92.9
NOVEMBER	100	54	46	11	89.0
TOTAL	1333	693	594	113	1097.3
AVERAGE	111	58	50	9	91.4

TABLE 6

B. O. D. AND PER CENT REMOVAL

MONTHS	RAW SEWAGE P.P.M.	PRIMARY EFFLUENT P.P.M.	PER CENT REMOVAL PRIMARY TO RAW	FINAL EFFLUENT P.P.M.	PER CENT REMOVAL COMPLETE TREATMENT
DECEMBER 1964	114	71	38	16	86.0
JANUARY	120	62	48	14	88.3
FEBRUARY	117	69	41	15	87.2
MARCH	144	98	32	15	89.6
APRIL	125	87	30	13	89.6
MAY	84	38	55	12	85.7
JUNE	73	37	49	2	97.2
JULY	68	38	44	2	97.1
AUGUST	69	32	54	2	97.1
SEPTEMBER	66	40	39	2.4	96.4
OCTOBER	84	58	31	8	90.5
NOVEMBER	81	73	11	9	88.9
TOTAL	1145	703	433	110.4	1093.6
AVERAGE	95	59	39	9	91.1

TABLE 7

PER CENT VOLATILE SUSPENDED SOLIDS

MONTHS	RAW SEWAGE	PRIMARY EFFLUENT	MIXED LIQUOR	RETURN SLUDGE
DECEMBER 1964	70	72	66	66
JANUARY	74	75	67	68
FEBRUARY	67	67	66	66
MARCH	66	69	64	62
APRIL	66	60	62	62
MAY	67	65	60	62
JUNE	73	74	63	63
JULY	68	72	65	66
AUGUST	74	74	65	64
SEPTEMBER	74	74	64	62
OCTOBER	78	76	69	68
NOVEMBER	62	64	62	60
TOTAL	839	842	773	769
AVERAGE	70	70	64	64

TABLE 8

GRIT - SCUM CUBIC FEET REMOVED

MONTHS	GRIT	SCUM
DECEMBER 1964	220	285
JANUARY	279	117
FEBRUARY	260	175
MARCH	268	267
APRIL	370	266
MAY	352	214
JUNE	434	253
JULY	363	182
AUGUST	488	308
SEPTEMBER	327	239
OCTOBER	297	338
NOVEMBER	336	301
TOTAL	4014	2940
AVERAGE	334	245

TABLE 9

pH

MONTHS	RAW SEWAGE	PRIMARY EFFLUENT	MIXED LIQUOR	RETURN SLUDGE	FINAL EFFLUENT
DECEMBER 1964	7.4	7.5	7.5	7.2	7.0
JANUARY	7.3	7.5	7.2	7.0	7.4
FEBRUARY	7.3	7.3	7.2	7.0	7.4
MARCH	7.4	7.5	7.4	7.1	7.5
APRIL	7.5	7.6	7.5	7.3	7.6
MAY	7.6	7.7	7.5	7.3	7.7
JUNE	7.5	7.5	7.3	7.1	7.4
JULY	7.2	7.3	7.1	7.0	7.3
AUGUST	7.3	7.4	7.1	7.0	7.3
SEPTEMBER	7.4	7.5	7.3	7.2	7.3
OCTOBER	7.4	7.5	7.4	7.2	7.5
NOVEMBER	7.6	7.7	7.4	7.1	7.5
TOTAL	88.9	90.0	87.9	85.5	88.9
AVERAGE	7.4	7.5	7.3	7.1	7.4

TABLE 10

MIXED LIQUOR - RETURN SLUDGE DATA

	MIXED LIQUOR			RETURN SLUDGE			
MONTHS	SUSPENDED SOLIDS P.P.M.	SETTLEABLE SOLIDS 30-MINUTES	SLUDGE INDEX	WASTE SLUDGE M.G.D.	RETURN SLUDGE M.G.D.	SUSPENDED SOLIDS P.P.M.	PER CENT RETURN BY VOLUME
DECEMBER 1954	1584	148	95	0.040	4.220	5511	41
JANUARY	1746	132	71	0.011	3.800	6092	32
FEBRUARY	1995	135	68	0.006	4.030	8948	34
MARCH	2260	142	63	0.008	3.510	9135	27
APRIL	2375	141	60	0.084	3.480	12567	26
MAY	1852	126	70	0.044	3.610	7930	35
JUNE	1826	145	80	0.079	3.460	6293	33
JULY	2028	142	71	0.095	3.670	6940	35
AUGUST	1785	139	69	0.053	3.710	7908	32
SEPTEMBER	1743	142	83	0.051	3.730	7848	29
OCTOBER	1367	140	106	0.088	3.750	5515	32
NOVEMBER	1735	140	83	0.051	3.970	6416	36
TOTAL	22,296	1672	919	0.530	44.940	91,103	392
AVERAGE	1858	139	77	0.044	3.745	7592	33

TABLE 11

AERATION DATA

MONTHS	SEWAGE FLOW THROUGH AERATORS M.G.D.	RETURN SLUDGE AERATORS M.G.D.	PER CENT RETURN SLUDGE BY VOLUME	WASTE SLUDGE TO PRIMARIES M.G.D.	AERATION RETENTION PERIOD HOURS	FINAL DETENT. PERIOD HOURS
DECEMBER 1964	14.4	4.2	29.1	.085	3.4	3.3
JANUARY	15.7	3.8	24.2	.011	3.1	2.5
FEBRUARY	16.0	4.0	25.0	.006	3.0	2.8
MARCH	16.5	3.5	21.2	.008	3.0	2.6
APRIL	16.9	3.5	20.7	.084	2.9	2.5
MAY	15.6	3.6	23.0	.044	3.1	2.8
JUNE	14.1	3.5	24.8	.079	3.4	3.2
JULY	14.1	3.7	26.2	.095	3.5	3.3
AUGUST	15.2	3.7	24.3	.055	3.2	3.0
SEPTEMBER	16.5	3.7	22.4	.051	3.0	2.7
OCTOBER	15.4	3.7	24.0	.088	3.2	2.9
NOVEMBER	14.9	4.0	26.8	.051	3.3	3.1
TOTAL	185.3	44.9	291.7	.530	38.1	34.7
AVERAGE	15.4	3.7	24.3	.044	3.2	2.9

TABLE 12

AIR CONSUMPTION

MONTHS	AIR MILLION CUBIC FEET PER DAY	AIR CUBIC PER GALLON SEWAGE	D.O. AT END OF AERATION P.P.M.	D.O. IN FINAL EFFLUENT P.P.M.
DECEMBER 1964	8.545	.84	2.5	5.8
JANUARY	8.811	.76	2.2	7.2
FEBRUARY	8.658	.76	2.4	6.6
MARCH	8.879	.68	3.3	7.1
APRIL	9.041	.68	3.5	6.8
MAY	9.052	.77	2.8	6.1
JUNE	8.743	.83	1.4	6.3
JULY	8.820	.86	1.6	4.4
AUGUST	8.981	.79	1.4	5.7
SEPTEMBER	8.881	.70	1.7	5.7
OCTOBER	9.024	.79	2.8	4.8
NOVEMBER	9.371	.87	2.1	6.2
TOTAL	106.805	9.33	27.7	72.7
AVERAGE	8.900	.78	2.3	6.1

TABLE 13

COMMINUTORS

TOTAL HOURS IN OPERATION

MONTHS	COMMINUTOR NO. 1	COMMINUTOR NO. 2
DECEMBER 1964	744	744
JANUARY	744	744
FEBRUARY	672	672
MARCH	744	744
APRIL	720	720
MAY	434	736
JUNE	376	720
JULY	576	624
AUGUST	562	614
SEPTEMBER	491	712
OCTOBER	292	744
NOVEMBER	554	720
TOTAL	6909	7750
AVERAGE	576	646

TABLE 14

AIR BLOWERS
TOTAL HOURS IN OPERATION

MONTHS	NO. 1 AIR BLOWER	NO.2 AIR BLOWER	NO. 3 AIR BLOWER	DIESEL ENGINE
DECEMBER 1964	80	95	31	674
JANUARY	0	0	0	744
FEBRUARY	0	0	0	672
MARCH	0	0	0	744
APRIL	138	138	128	518
MAY	188	188	176	468
JUNE	24	24	16	688
JULY	141	123	122	551
AUGUST	150	153	125	531
SEPTEMBER	120	104	96	546
OCTOBER	47	47	48	670
NOVEMBER	0	0	0	720
TOTAL	888	872	742	7526
AVERAGE	74	73	62	627

TABLE 15

RETURN SLUDGE PUMPS

TOTAL HOURS IN OPERATION

MONTHS	PUMP NO. 1	PUMP NO. 2	PUMP NO. 3	PUMP NO. 4
DECEMBER 1964	744	0	744	744
JANUARY	597	147	744	744
FEBRUARY	0	672	672	672
MARCH	144	600	744	744
APRIL	720	0	720	720
MAY	528	216	744	744
JUNE	24	720	696	720
JULY	0	744	744	744
AUGUST	192	744	558	744
SEPTEMBER	696	720	24	720
OCTOBER	744	744	0	744
NOVEMBER	720	720	0	720
TOTAL	5099	6028	6390	8760
AVERAGE	425	502	532	730

TABLE 16

DETRITOR AND CLEANING MECHANISM

TOTAL HOURS IN OPERATION

MONTHS	DETRITOR	CLEANING MECHANISM
DECEMBER 1954	744	744
JANUARY	744	744
FEBRUARY	672	672
MARCH	744	744
APRIL	720	720
MAY	497	497
JUNE	433	431
JULY	438	438
AUGUST	632	632
SEPTEMBER	558	558
OCTOBER	523	523
NOVEMBER	604	604
TOTAL	7309	7309
AVERAGE	609	609

TABLE 17

RAW SLUDGE TO DIGESTERS DATA

MONTHS	VOLUME 1000 GALLONS	DRY SOLIDS PER CENT	DRY SOLIDS 1000 LBS.	VOLATILE SOLIDS PER CENT	VOLATILE SOLIDS 1000 LBS.	PH
DECEMBER 1964	.655	3.5	193	60	116	7.1
JANUARY	.697	3.1	180	63	113	7.1
FEBRUARY	.659	4.2	231	62	143	7.0
MARCH	.666	5.1	284	59	168	7.4
APRIL	1.089	5.3	481	54	260	7.4
MAY	.570	4.0	190	57	108	7.7
JUNE	1.062	4.3	381	64	244	7.3
JULY	1.092	3.1	282	70	197	7.2
AUGUST	1.167	3.8	289	61	176	7.3
SEPTEMBER	1.029	4.6	395	57	225	7.4
OCTOBER	1.164	5.4	524	72	377	7.0
NOVEMBER	1.117	3.9	316	61	193	7.2
TOTAL	10.967	50.3	3764	740	2320	87.3
AVERAGE	.914	4.2	312	62	193	7.3

TABLE 18

GAS ENGINE OPERATION

MONTHS	HOURS IN OPERATION	CU. FT. GAS CONSUMED	GAL. OIL CONSUMED	AIR BLOWN 1000's CUBIC FEET OF AIR	FUEL CONSUMED PER 1000 CU.FT.AIR GAL. OIL	CU.FT.GAS
DECEMBER 1964	744	-----	7,244	274,195	.02	-----
JANUARY	744	-----	6,580	273,137	.02	-----
FEBRUARY	672	-----	6,497	242,409	.02	-----
MARCH	744	-----	7,509	275,275	.03	-----
APRIL	518	-----	5,092	189,322	.03	-----
MAY	469	-----	5,091	134,946	.04	-----
JUNE	688	667,000	3,104	139,560	.02	4.78
JULY	551	376,800	3,500	76,691	.03	4.91
AUGUST	531	225,200	4,780	45,656	.03	4.93
SEPTEMBER	546	-----	5,801	200,600	.02	-----
OCTOBER	670	-----	7,196	256,800	.03	-----
NOVEMBER	720	-----	7,439	281,117	.02	-----
TOTAL	7,597	1,269,000	69,833	2,389,708	.31	14.62
AVERAGE	633	105,750	5,819	199,142	.03	1.21

TABLE 19

SUMMARY SHOWING MONTHLY SALARY AND PAYROLL DISTRIBUTION

MONTHS	SEWAGE TREATMENT PLANT	GENERAL MAINTENANCE	SEWER DIVISION	ALDER AVENUE PUMPING STATION	TOTALS
JANUARY	4,030.02	12,091.80	5,580.40	1,615.20	23,317.42
FEBRUARY	4,670.58	14,620.46	7,027.98	2,047.52	28,366.54
MARCH	4,485.08	13,076.90	7,348.42	2,090.40	27,000.80
APRIL	4,912.71	13,699.42	5,584.07	2,208.32	26,404.52
MAY	4,696.07	14,892.73	6,104.44	2,068.96	27,762.20
JUNE	5,278.04	15,936.45	6,165.36	2,251.17	29,631.02
JULY	5,062.84	12,492.66	6,344.08	2,154.72	26,054.30
AUGUST	5,528.48	13,835.87	8,156.63	2,197.60	29,718.58
SEPTEMBER	5,112.30	13,110.13	7,276.14	2,173.48	27,672.25
OCTOBER	4,305.62	12,729.60	6,625.90	1,993.92	26,255.04
NOVEMBER	5,069.68	13,780.64	8,199.12	2,125.24	29,174.68
DECEMBER	6,045.04	16,014.52	9,090.01	2,572.80	33,723.47
1965 TOTALS	58,797.66	166,281.28	83,502.55	25,499.33	335,080.82
1964 TOTALS	54,933.59	143,745.11	101,531.53	23,573.67	323,783.90

TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY AND STORM WATER- ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953.

TRANSFER OF THE JURISDICTION OF THE SEWER DEPARTMENT TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1961. THE CONSTRUCTION , MAINTENANCE AND REPAIR OF ALL CITY SEWERS. ASSUMED BY THE SANITARY DISTRICT JANUARY 1, 1961.

TABLE 20

SUMMARY SHOWING OTHER UTILITY COSTS (1)

MONTHS	SEWAGE TREAT-MENT PLANT	ALDER STREET PUMPING STATION	MAGOUN AVENUE PUMPING STATION	MICHIGAN AVENUE PUMPING STATION	REMOTE (2) METERING CHANNEL SERVICES	TOTALS
JANUARY	579.72	21.92	19.62	14.45	23.62	659.43
FEBRUARY	657.09	24.81	19.62	14.45	23.62	739.59
MARCH	647.31	24.50	19.39	14.45	23.62	729.27
APRIL	625.92	25.27	18.70	14.45	23.62	707.96
MAY	488.00	27.58	19.16	14.45	23.62	572.81
JUNE	657.65	24.96	17.55	14.45	23.62	738.23
JULY	554.80	25.92	20.66	14.45	23.62	639.45
AUGUST	540.41	24.19	19.16	14.45	23.62	621.83
SEPTEMBER	677.51	24.50	18.93	14.45	23.62	759.01
OCTOBER	603.41	24.81	19.16	14.45	23.62	685.45
NOVEMBER	1,032.02	38.77	19.16	14.45	23.62	1,128.02
DECEMBER	1,013.23	24.83	19.16	14.45	23.62	1,095.29
1965	8,077.07	312.06	230.27	173.40	283.44	9,076.34
1964	10,198.08	276.32	199.03	132.32	283.44	11,089.19

(1) TELEPHONE AND TELEGRAPH, REMOTE METERING CIRCUIT, GAS AND WATER.
(2) INCLUDES SERVICES TO MARKSTOWN, MICHIGAN AVENUE, CANAL STREET, AND ROXANNA. PUMP STATION

* TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS- SANITARY AND STORM WATER- ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953.

TRANSFER OF THE JURISDICTION OF THE SEWER DEPARTMENT TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1961. THE CONSTRUCTION, MAINTENANCE AND REPAIR OF ALL CITY SEWERS. ASSUMED BY THE SANITARY DISTRICT JANUARY 1, 1961.

TABLE 21

SUMMARY SHOWING MONTHLY FUEL OIL COSTS

MONTHS	SEWAGE TREATMENT PLANT	ALDER STREET PUMPING STATION	MAGOUN AVENUE PUMPING STATION	TOTALS
JANUARY $	701.51	356.00	- ----	1,057.51
FEBRUARY	862.56	------	259.02	1,121.58
MARCH	840.49	361.00	88.92	1,290.41
APRIL	296.40	------	------	296.40
MAY	395.20	------	------	395.20
JUNE	395.20	------	------	395.20
JULY	395.20	------	------	395.20
AUGUST	395.20	------	------	395.20
SEPTEMBER	395.20	------	------	395.20
OCTOBER	824.09	361.00	------	1,185.09
NOVEMBER	788.22	------	88.92	877.14
DECEMBER	------	------	------	------
1965 TOTALS	6,289.27	1,078.00	436.86	7,804.13
1964 TOTALS	6,956.61	1,757.42	384.83	9,098.86

TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY AND STORM WATER- ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953

TRANSFER OF THE JURISDICTION OF THE SEWER DEPARTMENT OF THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANURRY 1, 1961. THE CONSTRUCTION, MAINTENANCE AND REPAIR OF ALL CITY SEWERS. ASSUMED BY THE SANITARY DISTRICT JANUARY, 1 , 1961.

TABLE 22

SUMMARY SHOWING ELECTRIC POWER COSTS

MONTHS	SEWAGE TREAT-MENT PLANT	ALDER STREET PUMPING STATION	MAGOUN AVENUE PUMPING STATION	CANAL STREET PUMPING STATION	MARKTOWN PUMPING STATION	ROXANNA PUMPING STATION	TOLL ROAD PUMPING STATION	MICHIGAN AVENUE PUMPING STATION	TOTALS
JANUARY	1,121.19	1,154.80	972.00	143.63	39.38	114.00	63.63	512.50	4,121.13
FEBRUARY	832.38	744.60	540.10	149.28	56.90	55.85	133.00	936.00	3,448.11
MARCH	907.35	2,173.00	NOT READ	163.33	48.25	129.00	61.33	512.50	3,994.76
APRIL	1,497.82	1,474.00	1,440.00	164.65	41.13	153.00	54.40	540.00	5,365.00
MAY	1,117.59	1,626.00	792.00	156.25	22.93	143.00	57.73	512.50	4,428.00
JUNE	1,176.97	NOT READ	540.00	102.95	20.00	81.00	NOT READ	512.50	2,433.42
JULY	1,208.07	1,215.60	396.25	91.78	20.00	70.00	52.50	512.50	3,566.70
AUGUST	810.86	NOT READ	468.00	84.63	20.00	NOT READ	52.50	512.50	1,948.49
SEPTEMBER	1,284.10	NOT READ	432.00	98.75	20.28	89.95	52.50	512.50	2,490.08
OCTOBER	1,087.10	4,096.37	540.00	92.13	22.78	50.00	72.00	512.50	6,472.88
NOVEMBER	500.00	250.00	250.00	50.00	20.00	35.00	30.00	511.80	1,646.80
DECEMBER	500.00	250.00	250.00	50.00	20.00	35.00	30.00	511.80	1,646.80
GRAND TOTAL (1965)	12,043.43	12,984.37	6,620.35	1,347.38	351.65	955.80	659.59	6,599.60	41,562.17
1964	16,103.93	18,039.20	7,272.38	1,494.20	398.07	1,353.50	584.57	7,716.12	52,074.23

TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY AND STORM WATER - ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953.

TABLE 23

SUMMARY SHOWING MONTHLY CHEMICAL COSTS

MONTHS	AMERICAN CYANAMID ALUM	MARBLEHEAD LIME	PENNSALT FERRIS CHLORIDE	ALEXANDER CHLORINE	TOTALS
JANUARY	------	------	-------	274.80	274.80
FEBRUARY	------	540.00	3,547.57	540.00	4,627.57
MARCH	------	------	-------	270.00	270.00
APRIL	1,440.00	649.50	-------	------	2,089.50
MAY	------	------	-------	------	------
JUNE	------	------	-------	810.00	810.00
JULY	------	------	-------	675.00	675.00
AUGUST	------	------	-------	675.00	675.00
SEPTEMBER	------	------	------	675.00	675.00
OCTOBER	------	------	------	675.00	675.00
NOVEMBER	------	------	------	675.00	675.00
DECEMBER	------	------	------	405.00	405.00
1965 TOTALS	1,440.00	1,189.50	3,547.57	5,674.80	11,851.87
1964 TOTALS	4,014.00	1,864.25	2,676.23	961.80	6,462.28

TABLE 24

BUDGET FOR 1965*

BUDGET CLASSIFICATION

FOR

DEPARTMENT OF PUBLIC SANITATION

SANITARY MAINTENANCE AND GENERAL EXPENSE FUND		
PERSONAL SERVICES		$ 346,617.00
CONTRACTUAL SERVICES		102,335.00
SUPPLIES		55,750.00
MATERIALS		14,000.00
CURRENT CHARGES		33,275.00
PROPERTIES		28,200.00
	TOTAL	$ 580,177.00
SANITARY DISTRICT BOND FUND		
CURRENT OBLIGATIONS		235,944.00
DEBT PAYMENTS		574,000.00
	TOTAL	$ 809,944.00
GRAND TOTAL - ALL FUNDS		$ 1,390,121.00

* TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1053. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY WATER - ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953.

TRANSFER OF THE JURISDICTION OF THE SEWER DEPARTMENT TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1961. THE CONSTRUCTION, MAINTENANCE AND REPAIR OF ALL CITY SEWERS. ASSUMED BY THE SANITARY DISTRICT JANUARY 1, 1961.

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

GUGGENHEIM BIOCHEMICAL TREATMENT

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED: Alum LBS/DAY	CHEMICALS USED: LBS/DAY	CHEMICALS USED: LBS/DAY	RAW SEWAGE: pH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: pH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: pH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION: MIXED LIQUOR: SETTLEABLE SOLIDS % IN 30 MINUTES	AERATION: MIXED LIQUOR: SUSP. SOLIDS—P.P.M.	AERATION: MIXED LIQUOR: SLUDGE INDEX	AERATION: MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION: MIXED LIQUOR: AIR USED IN AERATION MILLION CU. FT.	AERATION: RETURN SLUDGE: VOLUME—M.G.D.	AERATION: RETURN SLUDGE: SUSP. SOLIDS—P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	T				10.3					400			7.0	67	195	7.4	73	49	7.5	16	13	5.8		150	1780	84	1.8	8.82	4.29	6250
2	W				10.6				27	400			7.1	127	115	7.2	33	40	7.4	17	11	5.8		150	1548	97	2.6	8.70	4.25	5296
3	Th				11.1					400			6.9	21	171	7.1	46	93	7.2	15	1	6.6		150	1320	114	2.8	8.74	4.23	1132
4	F				9.4				27	400																		8.77	4.31	
5	S				8.2					400																		8.85	4.25	
6	Su				8.0					400			7.1	99	68	7.1	70	36	7.2	21	3	4.0		160	1484	108	1.6	8.72	4.11	5210
7	M				9.7					400			6.9	124	90	7.3	63	50	7.3	13	8	5.2		150	1524	98	1.8	8.74	4.25	4380
8	T				9.2					400			6.9	55	87	7.2	36	44	7.2	14	10	5.8		170	1656	103	2.0	8.79	4.29	3340
9	W				9.2				27	400			7.0	231	360	7.4	60	46	7.5	19	1	6.4		150	1512	99	2.0	8.87	4.22	4260
10	Th				12.7					400			7.0	77	103	7.2	74	54	7.3	15	2	5.4		140	1404	98	3.6	8.82	4.37	3630
11	F				13.2					400																		8.66	4.22	
12	S				11.2					400																		8.81	4.30	
13	Su				10.6					400			7.0	113	83	7.2	70	63	7.3	18	5	5.8		140	1628	86	5.0	8.61	4.32	5970
14	M				11.1				27	400			7.0	83	93	7.0	56	53	7.2	16	17	6.6		140	1492	94	3.6	8.86	4.26	6860
15	T				11.2					400																		8.82	4.18	
16	W				11.3				27	400			7.0	189	106	7.1	78	80	7.2	16	4	5.0		160	1276	125	3.0	8.74	4.13	5930
17	Th				9.9					400			7.2	148	181	7.0	84	63	7.2	17	5	4.6		160	2468	65	1.8	8.99	4.12	4270
18	F				10.2				27	400																		8.66	4.24	
19	S				9.9					400																		9.50	4.19	
20	Su				9.1					400			7.2	62	129	7.2	68	30	7.2	12	9	5.2		140	1690	83	2.8	9.56	4.25	5510
21	M				10.6				14	400			7.2	121	130	7.3	73	34	7.2	13	6	6.4		130	1536	85	2.2	9.68	4.14	5840
22	T				10.5					400			7.2	58	121	7.1	101	44	7.3	15	4	6.0		140	1484	94	1.6	8.96	4.14	6210
23	W				10.5				14	400																		8.95	4.18	
24	Th				10.8					400																		8.52	4.13	
25	F				9.2					400																		8.82	4.27	
26	S				9.3					400																		8.88	4.19	
27	Su				9.0					400			7.2	98	73	7.2	99	40	7.3	16	10	5.6		150	1492	101	1.2	8.88	4.26	4240
28	M				10.2				54	400			7.3	183	54	7.5	83	68	7.5	16	8	7.0		150	1620	93	1.0	8.80	4.22	5730
29	T				10.9					400			6.9	194	139	7.3	98	46	7.3	20	10	6.8		150	1616	93	1.4	8.72	4.16	5550
30	W				9.5				27	400			7.2	121	110	7.0	85	43	7.3	19	7	5.6		140	1568	89	1.6	8.72	4.16	5220
31	Th				10.4					400																		8.46	4.19	
TOTAL					313				271					2171	2428		1340	676		308	134				30100	1809	46.8	265.0	130.82	104710
AVERAGE					10.2					400			7.1	114	128	7.2	71	51	7.3	16	7	5.8		148	1584	95	2.5	8.57	4.33	5511
TYPE OF SAMPLE ANALYZED*													c	c	c	c	c	c	c	c	c	c		c	c		c			c
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12		12			12

*C = COMPOSITE; G = GRAB.

APPEARANCE OF ACTIVATED SLUDGE Good IF BULKING, IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None QUANTITY OF DRY S

WEATHER CONDITIONS Aver. 27.4° Hi. 48° Low 2° AVERAGE TEMP. OF R

OTHER REMARKS Maintenance High, we took Digester #1 out of service for repairs — Ruptured Line

S.B.H. 5-0-26 ('48-25M)

OPERATION
PLANT
TREATMENT

REPORT FOR EAST CHICAGO, IND. (CITY)

FOR MONTH OF DECEMBER 19 64

SIGNED BY [illegible]

	AERATION — ED LIQUOR			RETURN SLUDGE		SLUDGE DIGESTION													
	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X 1000	RAW SLUDGE TO DIGESTER—GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN—GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
	84	1.8	8.82	4.29	4250	0.32	23.9	3.7	61	98	7.2	56.5	47.2	26.0	2.0			
	97	2.6	8.70	4.25	5290	0.63	20.9	3.2	60	98	7.1	50.0	56.5	24.0	1.6			
	114	2.8	8.74	4.23	11320	0.90	17.7	2.8	44	98	7.2	52.0	56.7	24.0	0.8			
			8.77	4.31		0.35	19.3			97		48.6	43.5	30.0				
			8.85	4.25		0.87	18.2			95		39.0	34.0	24.0				
	108	1.6	8.72	4.11	5210	1.03	29.9	3.7	67	95	7.0	44.6	53.9	24.0	3.9			
	98	1.8	8.74	4.25	4380	0.41	22.3	3.4	50	98	7.1	47.0	50.5	21.0	4.0			
	103	2.8	8.79	4.29	3340	0.33	18.1	3.2	47	98	7.1	40.9	31.4	21.0	4.3			
	99	2.0	8.87	4.22	4260	1.20	21.0	4.6	64	95	7.3	44.0	50.4	18.0	3.8			
	98	3.6	8.82	4.37	3630	0.34	18.1	4.6	71	96	7.2	42.1	32.0	21.0	4.1			
			8.66	4.22		0.48	21.2			96		45.6	44.1	21.0				
			8.81	4.30		0.64	19.9			97		48.8	51.1	21.0				
	86	5.0	8.61	4.32	5970	0.98	18.1	3.4	41	98	7.2	59.4	55.7	21.0	0.2			
	94	3.6	8.86	4.26	6860	0.44	23.6	3.4	59	98	7.0	47.5	46.4	24.0	1.4			
			8.82	4.18		0.47	20.0			97		46.0	48.5	21.0				
	125	3.0	8.74	4.13	5930	1.34	24.6	4.2	71	97	7.0	48.0	44.9	27.0				
	65	1.8	8.99	4.12	4270	1.19	18.2	4.5	75	97	7.0	39.2	37.5	30.0	1.2			
			8.66	4.24		0.37	23.0			98		37.1	36.3	21.0				
			9.50	4.19		0.62	19.3			98		42.3	43.2	1.0				
	83	2.8	9.56	4.25	5510	0.51	21.7	2.8	78	97	7.0	35.2	28.7	33.0	0.7			
	85	2.2	9.68	4.11	5540	1.08	22.4	4.7	33	97	7.0	37.7	44.9	30.0	0.6			
	94	1.6	8.96	4.14	6210	0.54	18.3	4.4	65	97	7.0	41.8	34.8	27.0	0.2			
			8.95	4.18		1.53	24.3			97		48.5	37.0	24.0				
			8.52	4.13		1.79	19.2			97		48.0	41.6	24.0				
			8.82	4.27		0.69	18.3			97		40.0	40.4	18.0				
			8.88	4.19		0.87	18.0			98		38.9	47.1	27.0				
	101	1.2	8.88	4.26	4240	0.37	30.0	5.1	56	97	7.0	38.1	41.1	30.0	1.8			
	93	1.0	8.80	4.22	5730	0.72	22.1	4.7	54	96	7.1	44.5	38.4	0.0				
	93	1.4	8.72	4.16	5550	1.15	24.0	4.5	61	95	7.0	43.4	42.3	24.0	2.2			
	89	1.6	8.72	4.16	5220	0.84	22.6	3.9	75	95	7.0	37.8	30.2	24.0	2.9			
			8.46	4.19		1.35	23.3			98		49.2	58.0	24.0				
	1809	46.8	215.60	130.82	104710	24.37	655					1376.7	1349.3					
	95	2.5	8.57	4.22	5511	0.79	21.1	3.5	6.0	97	7.1	44.2	43.5	24.4	2.1			
		C			C			G	G		G			G	G			
		12			12													

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 55°

— RUPTURED LINE NOT REPAIRED BECAUSE OF ADVERSE WEATHER CONDITION

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	38	68
SECONDARY TREATMENT	48	27
OVERALL TREATMENT	86	95

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.95	1.74	2.28
AERATION TANK	3.82	2.80	3.41
FINAL SETTLING TANK	3.62	2.20	2.87

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			676
FINAL SETTLING TANK			432

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			13528
FINAL SETTLING TANK			10828

EQUIV. POP. TREATED = 57,067
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.837
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1033
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	27.6

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD./DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO. $ 4,000.00

ELECTRICITY PURCHASED ____ K.W.H. $ 1,333.10

GAS PURCHASED ____ C.F. $ 644.93

[redacted] WATER $ 299.60

MAINTENANCE $ 1,207.99

OTHER OPERATING COSTS $

AMORTIZATION COSTS $

PAYMENTS TO DEPRECIATION FUND $

TOTAL $ 7,585.53

COST/M.G. SEW. TREAT. $ 23.93

COST/CAPITA/MO. $ 0.133

COST/1000 LB. B.O.D. REMOVED $ 29.52

REVENUE RECEIVED $

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

GUGGENHEIM BIOCHEMICAL TREATMENT

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED: AL UM LBS/DAY	CHEMICALS USED: CHLORINE LBS/DAY	CHEMICALS USED: LBS/DAY	RAW SEWAGE: PH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: PH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: PH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION: MIXED LIQUOR: SETTLEABLE SOLIDS IN 30 MINUTES	AERATION: MIXED LIQUOR: SUSP. SOLIDS P.P.M.	AERATION: MIXED LIQUOR: SLUDGE INDEX	AERATION: MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION: MIXED LIQUOR: AIR USED IN AERATION MILLION CU. FT.	AERATION: RETURN SLUDGE: VOLUME—M.G.D.	AERATION: RETURN SLUDGE: SUSP. SOLIDS P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1					14.6					400	120																	8.69	4.20	
2					10.5					400	120																	8.91	4.26	
3					14.4					400	120		7.4	59	57	7.5	64	45	7.5	18	8	7.6		120	1388	86	3.6	8.73		4820
4					11.9				54	400	120		7.5	137	140	7.6	40	42	7.7	18	8	7.0	0.4	130	1576	82	2.4	8.86	4.22	6890
5					11.3					406	120		7.3	27	87	7.6	39	59	7.5	14	4	7.2	0.3	90	2052	39	1.4	9.83	4.26	5340
6					10.6					400	120		7.5	189	93	7.7	76	42	7.5	14	6	7.4	0.4	145	1316	110	1.0	8.67	4.06	5120
7					10.2					400	120		7.5	88		7.5	80		7.4	22		9.0	0.3	150			1.2	8.75	4.26	
8					11.3					400	120												0.3					8.70	4.27	
9					10.4					400	120																	8.90	4.35	
10					10.2					400	120		7.4	198	133	7.5	58	34	7.5	14	4	8.6		140	1762	80	2.0	8.86	4.35	5750
11					11.0				54	400	120		7.3	60	78	7.5	58	43	7.4	12	10	6.4	0.3	165	1704	97	0.8	8.70	4.35	7030
12					10.1					400	120		7.5	176	133	7.6	71	48	7.5	8	4	7.8	1.4	140	1420	98	1.6	8.78	4.31	5680
13					9.6				21	400	120		7.6	134	121	7.6	30	41	7.4	8	4	7.4	0.6	140	1584	88	2.0	8.24	4.29	5470
14					10.0					400	120		7.4	258	103	7.6	113	47	7.4	21	4	7.6	0.3	140	1466	96	0.8	8.93	4.36	4026
15					9.7				14	400	120												0.1					8.87	3.80	
16					10.0					400	120																	8.91	3.41	
17					9.6					400	120		7.4	61	55	7.5	61	49	7.5	6	11	8.2		130	1324	98	2.4	8.86	3.48	5470
18					10.8				27	400	120		7.4	64	76	7.5	105	67	7.4	15	28	7.6	0.3	125	1360	92	1.8	8.76	3.46	6220
19					11.1					400	120		7.2	200	163	7.4	44	55	7.0	3	14	7.6	0.3	135	1460	92	2.8	8.73	3.45	6080
20					10.8					400	120		7.3	114	83	7.4	61	46	7.3	20	6	6.8	0.2	135	1452	93	2.2	8.74	3.40	6400
21					11.1					400	120		7.2	161	141	7.3	68	53	7.2	19	4	6.8	0.2	140	1568	89	1.0	7.24	3.43	5900
22					17.2				14	400	120																	8.69	3.47	
23					14.5				27	400	120																	8.64	3.48	
24					13.4					400	120		7.1	320	161	7.4	52	40	7.2	2	17	6.2	0.2	140	2664	63	4.0	8.61	3.40	3460
25					15.3				14	400	120		7.0	69	73	7.5	67	46	7.4	9	8	7.0	0.2	125	1992	63	5.0	8.69	3.36	5320
26					14.1					400	120		7.2	57	129	7.4	58	80	7.3	15	29	6.0	0.2	120	1950	62	3.2	8.81	3.43	4550
27					13.5				54	400	120		7.2	77	62	7.5	49	53	7.4	19	25	6.6	0.2	150	2376	55	3.8	9.05	3.50	8490
28					12.3					400	120		7.0	82	45	7.4	41	31	7.4	17	11	5.0	0.2	125	2496	50	0.2	9.05	4.40	5940
29					12.5					400	120												0.2					9.03	4.22	
30					13.3					400	120																	10.21	4.25	
31					13.6					400	120		7.1	43	42	7.5	62	43	7.5	11	20	7.4	1.0	125	2048	61	2.6	8.91	4.43	9230
TOTAL					367.8				279					2524	2001		1304	969		285	220				34934			213.4	117.9	121985
AVERAGE					11.9					400	120		7.3	120	100	7.5	62	48	7.4	14	11	7.2	0.4	132	1746	71	2.2	8.82	3.80	6092
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C	C/G	C	C		C			C
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12	12/1	12	12		12			12

*C = COMPOSITE; G = GRAB.

APPEARANCE OF ACTIVATED SLUDGE LIGHT BROWN (GOOD) IF BULKING, IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN NONE QUANTITY OF DRY SL

WEATHER CONDITIONS AVER 24.5° MAX 63° MIN. -9° AVERAGE TEMP. OF R

OTHER REMARKS DIGESTER #1 OUT OF SERVICE

OPERATION
PLANT
TREATMENT

REPORT FOR EAST CHICAGO, IND. (CITY)

FOR MONTH OF JANUARY 1965

SIGNED BY

	AERATION — MIXED LIQUOR			RETURN SLUDGE		SLUDGE DIGESTION													
	SLUDGE INDEX	DISSOLVED OXYGEN - P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME - M.G.D.	SUSP. SOLIDS - P.P.M.	WASTE ACT. SLUDGE TO DIGESTER - GAL. X 1000	RAW SLUDGE TO DIGESTER - GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE - %	TOTAL VOL. SOLIDS IN RAW SLUDGE - %	TEMPERATURE IN DIGESTER - °F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN - GAL. X 1000	SOLIDS IN SUPERNATANT - %	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE - %	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE - %
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
			8.69	4.20		0.13	21.8			94		48.8	36.9	21.0				
			8.91	4.26		0.26	40.2			94		48.2	40.9	24.0				
8	86	3.6	8.73		4820	0.35	32.6	6.5	5.1	94	7.3	51.4	54.2	24.0	2.6			
6	82	2.4	8.86	4.22	6890	0.06	21.7	4.6	7.3	94	7.2	55.0	51.2					
2	39	1.4	9.83	4.26	5340	0.11	21.4			97	7.2	45.6	45.6					
6	110	1.0	8.67	4.06	5120		22.2	3.4	5.3	96	7.2	40.9	37.2	30.0	0.4			
		1.2	8.75	4.26		0.08	21.3	3.5	6.5	95	7.1	42.1	31.9	36.0	1.6			
			8.70	4.27			23.5			96		48.3	48.3	18.0				
			8.90	4.35			26.9			95		51.4	53.3	27.0				
2	80	2.0	8.86	4.35	5750		22.9	2.3	3.6	95	7.0	52.1	63.4	39.0	1.7			
4	97	0.8	8.70	4.35	7030	0.03	22.0	3.6	7.2	95	7.1	43.8	40.9	24.0	3.9			
0	98	1.6	8.78	4.31	5680	0.06	18.4	2.8	7.7	96	7.2	30.8	35.8	30.0	2.8			
7	88	2.0	8.24	4.29	5470	0.06	22.5	3.7	6.1	96	7.2	36.3	31.1	30.0	2.8			
6	96	0.8	8.93	4.36	4020	0.03	19.5	3.1	6.7	96	7.1	39.1	40.9	30.0	3.8			
			8.77	3.80		0.05	23.0			96		53.0	53.8	24.0				
			8.91	3.41		0.03	18.0			97		46.5	49.0	21.0				
8	98	2.4	8.86	3.48	5470		20.4	3.5	7.1	96	7.1	42.7	49.8	24.0	0.6			
0	92	1.8	8.76	3.46	6220		22.6	4.0	7.9	96	7.1	40.2	21.6					
0	92	2.8	8.73	3.45	6080	0.04	19.8	2.0	6.0	95	7.0	38.9	46.0	24.0	4.1			
2	93	2.2	8.74	3.40	6400	0.03	21.0	2.3	7.5	96	6.8	38.9	32.5	45.0	0.4			
8	89	1.0	7.24	3.43	5900	0.09	27.0	3.3	4.4	96	6.9	32.2	30.4	24.0	3.2			
			8.69	3.47			21.0			97		41.9	40.6	21.0	[illegible]			
			8.64	3.48		0.03	27.0			97		44.1	45.6	30.0	[illegible]			
4	63	4.0	8.61	3.40	13460	0.08	21.0	5.0	6.4	96	7.0	37.5	41.4	30.0	2.0			
2	63	5.0	8.69	3.36	5320	0.03	19.7	1.0	4.0	95	7.0	36.5	32.4	21.0	1.4			
0	62	3.2	8.81	3.43	14550		18.1	3.0	6.0	96	7.1	40.0	43.0	21.0	[illegible]			
6	55	3.8	9.05	3.50	8490		22.9	0.8	7.5	96	7.1	43.2	47.5	24.0				
6	50	0.2	9.05	4.40	5940	0.04	17.8	1.4	6.7	95	7.1	43.4	41.1	24.0	0.2			
			9.03	4.22		0.11	24.3			96	7.1	37.5	40.3	30.0	[illegible]			
			10.21	4.25			18.1			94		38.7	42.4	24.0				
48	61	2.6	8.91	4.43	9230		19.7	3.3	7.1	93	7.0	37.9	31.1	22.0	1.8			
33			213.4	117.9	121835		697.3					1326.7	1307	0756.0				
46	71	2.2	8.52	3.80	6092	0.11	22.5		6.3	94	7.1	42.8	42.2	27.0	2.1			
		C			C			C	C		C			C	C			
2		12			12													

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 55°

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	48	52
SECONDARY TREATMENT	40	37
OVERALL TREATMENT	88	89

DETENTION TIME - HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.39	1.34	1.98
AERATION TANK	3.76	2.48	3.13
FINAL SETTLING TANK	3.03	1.69	2.55

SURFACE FLOW RATE GAL. SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			787
FINAL SETTLING TANK			504

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			15734
FINAL SETTLING TANK			12693

EQUIV. POP. TREATED = 58,382
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C.F. AIR/GAL. SEW. TREATED	0.743
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	876
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	22.5

GARB. TO DIGESTER - % TOT. SOLIDS	
GARB. TO DIGESTER - % TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S. DAY TO DIGESTER	
TOT. LBS. VOL. SOL. DAY TO DIGESTER	
C.F. GAS PROD./DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO. $ 4,030.02

ELECTRICITY PURCHASED ____ K.W.H. $ 1,121.19

GAS PURCHASED ____ C.F. $ 475.97

CHEMICALS & SUPPLIES $ 274.80

MAINTENANCE $ 701.07

OTHER OPERATING COSTS $ 926.02

AMORTIZATION COSTS $

PAYMENTS TO DEPRECIATION FUND $

TOTAL $ 4,529.51

COST/M.G. SEW. TREAT. $ 20.46

COST/CAPITA/MO. $ 0.132

COST/1000 LB. B.O.D. REMOVED $ 24.12

REVENUE RECEIVED $

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

GUGGENHEIM BIOCHEMICAL TREATMENT

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER CU. FT.	CHEMICALS USED: ALUM LBS/DAY	CHEMICALS USED: CHLORINE LBS/DAY	CHEMICALS USED: LBS/DAY	RAW SEWAGE: pH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: pH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: pH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION MIXED LIQUOR: SETTLEABLE SOLIDS % IN 30 MINUTES	AERATION MIXED LIQUOR: SUSP. SOLIDS—P.P.M.	AERATION MIXED LIQUOR: SLUDGE INDEX	AERATION MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION MIXED LIQUOR: AIR USED IN AERATION MILLION CU. FT.	RETURN SLUDGE: VOLUME—M.G.D.	RETURN SLUDGE: SUSP. SOLIDS P.P.M.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	M			13.2				14	400	120		7.1	151	83	7.1	70	41	7.3	8	13	7.4	1.0	130	1648	79	3.6	9.16	4.95	8720
2	T			13.0					400	120		7.1	92	66	7.4	67	56	7.3	19	14	6.0		100	1588	63	1.6	9.30	4.43	8830
3	W			12.0					400	120		7.0	89	65	7.5	53	54	7.5	18	20	6.4		110	1856	59	3.0	9.27	4.45	7980
4	Th			11.8					400	120		7.1	100	87	7.5	68	50	7.5	20	7	6.2		120	1720	70	1.8	9.29	4.46	7010
5	F			12.5				14	400	120												0.2					8.88	4.43	
6	S			11.8					400	120												0.6					8.96	4.44	
7	Su			12.1					400	120		7.3	99	88	7.5	62	30	7.4	3	11	6.8	0.8	135	2372	57	2.2	8.91	4.43	8370
8	M			12.1					400	120		7.3	125	234	7.4	82	45	7.3	17	25	6.8	0.6	160	2248	67	2.4	9.00	4.31	8690
9	T			13.9					400	120		7.4	150	189	7.6	67	82	7.5	21	13	6.6	0.6	140	2184	64	2.4	8.61	4.21	8850
10	W			12.0				27	400	120		7.0	149	197	7.4	68	58	7.4	19	16	6.6	0.4	135	2344	58	2.4	8.85	4.30	10490
11	Th			13.3					400	120			85	102		61	113		18	24		0.4		2200			8.92	4.42	9760
12	F			12.1					400	120												0.4					9.10	4.35	
13	S			11.5					400	120																	8.98	4.34	
14	Su			11.2					400	120		7.0	93	61	7.4	73	41	7.3	2	17	7.2		135	1988	68	3.0	9.12	4.33	7730
15	M			12.5					400	120		7.1	167	177	7.4	108	64	7.3	17	8	6.4	1.2	135	1932	70	1.8	8.95	3.80	8940
16	T			12.1					400	120		7.2	230	101	7.4	60	60	7.4	17	11	7.0	0.2	140	1668	84	2.6	8.93	3.69	8970
17	W			12.8				14	400	120		7.2	104	72	7.1	48	69	7.3	9	21	6.6	0.2	130	2020	64	2.0	8.92	3.65	7890
18	Th			12.4					400	120		7.0	63	72	7.3	44	58	7.3	19	19	6.2	0.1	150	2088		2.0	8.83	3.68	9180
19	F			10.3				27	400	120												0.2					9.05	3.78	
20	S			10.8					400	120																	8.85	3.66	
21	Su			11.3					400	120		7.2	131	81	7.4	59	42	7.4	2	7	7.0		140	1920	73	4.0	9.02	3.68	8860
22	M			12.1					400	120		7.0	98	59	7.4	85	48	7.3	17	11	6.4	0.8	130	2096	63	2.4	9.10	3.66	11080
23	T			11.0					400	120		7.0	71	76	7.3	68	67	7.3	18	15	6.8	1.8	140	2080	67	2.0	8.89	3.71	11010
24	W			10.3					400	120		7.1	80	82	7.3	95	47	7.3	16	13	6.0	0.2	150	1916	78	2.0	9.08	3.54	9360
25	Th			10.4					400	120		7.0	166	97	7.3	96	53	7.3	19	11	6.2	0.2	155	2028	76	2.4	9.02	3.65	8290
26	F			10.4					400	120												0.2					9.05	3.73	
27	S			12.7					400	120																	8.90	3.66	
28	Su			13.6					400	120		6.9	74		7.3	34		7.3	19		7.0	0.6	135			2.8	8.75	3.81	
29																													
30																													
31																													
TOTAL				335.8				96					2337	1992		1368	1078		298	276				37896			2424	113.0	110010
AVERAGE				12.0					400	120		7.1	117	105	7.3	69	57	7.4	15	15	6.6	0.5	135	1995	68	2.4	8.66	4.03	8948
TYPE OF SAMPLE ANALYZED*												C	C	C	C	C	C	C	C	C	C		C	C		C			C
NO. OF PORTIONS COLLECTED DAILY												12	12	12	12	12	12	12	12	12	12		12	12		12			12

*C = COMPOSITE; G = GRAB.

APPEARANCE OF ACTIVATED SLUDGE Light Brown IF BULKING, IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None QUANTITY OF DRY SLU

WEATHER CONDITIONS Aver. 27.4° Max. 59° Min −9° Snow Storm of 11.5" on the 27th & 28th AVERAGE TEMP. OF RA

OTHER REMARKS Digester #1 out of service

S.B.H. 5-0-26 ('48-25M)

OPERATION
PLANT
TREATMENT

REPORT FOR EAST CHICAGO IND. (CITY)

FOR MONTH OF FEBRUARY 1965

SIGNED BY Lorne R. Dahn

AERATION D LIQUOR			RETURN SLUDGE		SLUDGE DIGESTION												
SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME M.G.D.	SUSP. SOLIDS P.P.M.	WASTE ACT. SLUDGE TO DIGESTER GAL X1000	RAW SLUDGE TO DIGESTER GAL X1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
79	3.6	9.16	4.35	8720	0.01	27.0	4.9	71	95	1.0	37.8	36.6	27.0	1.5			
63	1.6	9.30	4.43	8830		17.3	4.8	61	94	7.0	39.5	42.7	27.0	1.8			
59	3.0	9.27	4.45	7980		27.0	4.8	57	94	7.1	37.9	38.4	24.0	3.7			
70	1.8	9.29	4.46	7010		24.0	5.1	48	94	7.1	47.0	47.0	36.0	2.8			
		8.88	4.43			27.0			95		39.3	40.3	27.0				
		8.96	4.44			27.0			96		42.0	54.2	30.0				
57	2.2	8.91	4.43	8370		30.0	5.2	64	97	7.1	39.0	34.5	33.0	0.2			
67	2.4	9.00	4.31	8690	0.08	30.0	4.5	59	97	7.2	37.0	39.0	30.0	0.8			
64	2.4	8.61	4.21	8850	0.03	24.0	5.2	52	96	7.1	36.2	41.6	24.0	0.8			
58	2.4	8.85	4.30	10490	0.09	30.0	4.2	58	96	7.0	44.0	39.0	30.0	5.9			
		9.2	4.42	9760	0.02	30.0	4.6	64	97		40.0	41.5	30.0	2.2			
		9.10	4.35		0.09	24.0			98		38.4	34.8	27.0				
		8.98	4.34		0.03	17.7			97		36.9	42.4	30.0				
68	3.0	9.12	4.33	7730	0.06	30.0	3.0	60	97	7.0	34.0	33.8	30.0	1.8			
70	1.8	8.95	3.80	8940	0.05	36.0	3.2	75	97	6.9	35.8	40.4	30.0	0.6			
84	2.6	8.93	3.69	8970	0.07	18.6	2.2	36	97	7.0	36.0	43.2	33.0	2.5			
64	2.0	8.92	3.65	7890	0.03	23.0	2.5	75	96	6.9	38.6	31.5	24.0	1.2			
	2.0	8.83	3.68	9180	0.05	18.9	5.2	46	97	6.9	36.1	37.5	24.0	3.0			
		9.05	3.78		0.06	21.0			97		31.9	30.4	21.0				
		8.85	3.66		0.05	18.0			97		27.6	31.6	18.0				
73	4.0	9.02	3.68	8860	0.16	21.0	4.6	55	98	7.0	33.3	36.2	21.0	0.2			
63	2.4	9.10	3.66	11080	0.07	21.0	4.8	61	96	6.9	33.2	32.7	21.0	3.7			
67	2.0	8.89	3.71	11010	0.08	18.0	3.6	72	97	6.9	35.6	42.8	18.0	3.1			
78	2.0	9.08	3.54	9360	0.03	21.0	2.7	77	97	7.0	40.4	35.6	21.0	5.9			
76	2.4	9.02	3.65	8290	0.21	18.0	4.9	70	98	6.9	39.7	31.7	18.0	0.6			
		9.05	3.73		0.07	21.0			96		32.0	24.3	21.0				
		8.90	3.66		0.04	18.0			97		32.0	42.7	18.0				
	2.8	8.75	3.81		0.03	21.0	4.2	76	97	6.9	37.0	31.3	21.0	1.0			
		242.4	113.0	1100.0	1.41	259.2	84.2	237			1036.2	1058.7	714.0				
68	2.4	8.66	4.03	8948	0.06	23.6	4.2	62	96	7.0	37.0	37.8	26.0	2.1			
	C			C			C	C		C	C		C	C			
	12			12			12	12									

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 52°

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	41	46
SECONDARY TREATMENT	46	40
OVERALL TREATMENT	87	86

DETENTION TIME HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.39	1.50	1.98
AERATION TANK	3.76	2.48	3.13
FINAL SETTLING TANK	3.08	1.69	2.52

SURFACE FLOW RATE GAL. SQ. FT. DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			796
FINAL SETTLING TANK			509

WEIR OVERFLOW RATE GAL. FT. OF WEIR DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			15915
FINAL SETTLING TANK			12739

EQUIV. POP. TREATED = 68,878
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.722 ~~0.957~~
C.F. AIR LB. B.O.D. REMOVED IN SECONDARY TREATMENT	957
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	22.9

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S. DAY TO DIGESTER	
LBS. GARB. T.V.S. DAY TO DIGESTER	
TOT. LBS. VOL. SOL. DAY TO DIGESTER	
C.F. GAS PROD. DAY LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL MO. $	4,354.84
ELECTRICITY PURCHASED ____ K.W.H. $	832.38
GAS PURCHASED ____ C.F. $	355.50
CHEMICALS & SUPPLIES $	4,455.62
[redacted] FUEL OIL $	862.56
OTHER OPERATING COSTS $	1,267.92
AMORTIZATION COSTS $	
PAYMENTS TO DEPRECIATION FUND $	
TOTAL $	12,128.82
COST M.G. SEW. TREAT. $	36.12
COST/CAPITA/MO. $	0.213
COST/1000 LB. B.O.D. REMOVED $	42.94
REVENUE RECEIVED $	

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

GUGGENHEIM BIOCHEMICAL TREATMENT

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED: Alum LBS/DAY	CHEMICALS USED: Chlorine LBS/DAY	CHEMICALS USED: LBS/DAY	RAW SEWAGE: pH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: pH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: pH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION: MIXED LIQUOR: SETTLEABLE SOLIDS IN 30 MINUTES	AERATION: MIXED LIQUOR: SUSP. SOLIDS—P.P.M.	AERATION: MIXED LIQUOR: SLUDGE INDEX	AERATION: MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION: MIXED LIQUOR: AIR USED IN AERATION MILLION CU. FT.	AERATION: RETURN SLUDGE: VOLUME—M.G.D.	AERATION: RETURN SLUDGE: SUSP. SOLIDS—P.P.M.	WASTE ACT. SLUDGE
1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	M				13.1				27	400	120		7.1	146		7.3	92		7.3	13	0.0	7.0	0.6	140			2.0	8.60	3.65		0.5
2	T				13.8					400	120		7.1	176		7.2	108		7.1	19	0.0	6.0	1.2	160			3.0	8.92	3.60		0.1
3	W				12.3					400	120		7.3	142		7.5	68		7.5	21		7.2	0.4	165			2.6	8.77	3.60		0.1
4	Th				13.2					400	120		6.8	98		6.8	71		7.1	19		6.4	0.3	145			2.8	8.88	3.76		0.5
5	F				13.1					400	120												0.4					8.77	3.79		0.5
6	S				12.5					400	120												0.2					8.82	3.75		0.5
7	Su				11.5					400	120		7.6	168	80	7.6	100	62	7.6	1	4	7.0		160	1956	82	3.6	8.89	3.74	10610	0.5
8	M				12.3					400	120		7.2	82	60	7.5	106	96	7.6	17	15	6.8	1.6	155	2536	61	2.0	8.75	3.48	8150	0.4
9	T				13.1					400	120		7.1	178	163	7.6	103	101	7.6	18	12	6.8	0.4	160	2100	76	4.2	8.75	3.39	12410	0.1
10	W				12.9					400	120		7.2	206	80	7.5	128	53	7.6	20	12	7.2	0.4	160	1876	85	2.8	8.95	3.34	10650	0.1
11	Th				13.4					400	120		7.2	157	50	7.6	88	30	7.6	20	9	7.2	0.4	135	2300	59	2.6	8.95	3.52	10360	
12	F				12.8				54	400	120												0.3					8.82	3.43		0.4
13	S				11.7					400	120																	8.84	3.50		0.5
14	Su				11.2					400	120		7.2	112	142	7.4	124	99	7.5	17	11	7.2		130	2012	65	4.0	8.92	3.43	10900	0.5
15	M				12.0				54	400	120		7.0	165	256	7.6	119	227	7.[illegible]	16	6	7.2	1.6	140	2108	66	4.2	8.81	3.48	9800	0.5
16	T				12.9					400	120		7.1	133	167	7.7	141	106	7.7	18	16	7.6	0.2	120	1868	64	3.0	8.98	3.46	10210	0.5
17	W				16.7					400	120		7.3	200	440	7.5	124	246	7.4	19	3	7.0	0.2	130	2168	60	3.8	8.73	3.40	9130	0.5
18	T				15.4					400	120		7.2	118	136	7.6	113	132	7.5	16	5	6.2	0.2	140	2692	52	2.4	8.93	3.44	12540	0.5
19	F				15.0				27	400	120												0.2					9.02	3.41		0.1
20	S				14.3					400	120																	9.02	3.46		0.1
21	Su				12.8					400	120		7.3	124	121	7.5	108	119	7.6	3	14	7.6		140	2318	60	4.4	8.97	3.40	10870	0.1
22	M				12.6				27	400	120		7.3	120	187	7.7	68	89	7.7	14	15	6.8	1.2	140	2888	48	4.4	8.89	3.46	11070	0.5
23	T				13.1					400	120		7.2	136	66	7.6	95	77	7.5	18	29	6.8	0.1	130	2188	59	4.4	8.91	3.45	9420	0.5
24	W				13.6					400	120		7.1	152	112	7.5	95	101	7.5	18	10	7.2	0.2	120	1976	61	4.2	8.93	3.48	10310	0.5
25	Th				12.6					400	120		7.3	130	117	7.6	79	90	7.5	14	15	8.2	0.2	120	1780	67	2.8	8.98	3.57	11950	0.5
26	F				12.2				54	400	120												0.2					8.93	3.45		0.5
27	S				12.1					400	120																	8.94	3.41		0.4
28	Su				13.4					400	120		7.3	61	82	7.6	111	167	7.6	0	14	7.2	0.1	140	2324	60	4.4	8.83	3.47	12060	
29	M				14.1					400	120		7.2	136	187	7.6	76	64	7.6	14	11	7.4	0.2	130	2508	52	3.8	8.93	3.45	15030	0.5
30	T				12.1					400	120		7.2	169	212	7.6	81	198	7.6	19	6	7.2	0.2	155	2916	53	2.0	8.95	3.46	10820	0.5
31	W				12.2					400	120		7.4	218	212	7.6	78	122	7.6	15	6	7.0	0.2	140	2408	58	4.2	8.89	3.49	10820	0.5
TOTAL					404.0				243					3322	2870		2376	2179		349	223				42942	1188	77.6	275.3	108.4	210110	2.5
AVERAGE					13.0				41	400	120		7.2	144	151	7.5	98	115	7.5	15	15	7.1	0.4	142	2260	63	3.4	8.88	3.51	9135	0.5
TYPE OF SAMPLE ANALYZED*																															
NO. OF PORTIONS COLLECTED DAILY																															

*C = COMPOSITE; G = GRAB.

APPEARANCE OF ACTIVATED SLUDGE Dark Brown ... IF BULKING, IN WHAT PE

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None ... QUANTITY OF DRY SLUD

WEATHER CONDITIONS Aver. 30.2° Max. 60° Min. 8° ... AVERAGE TEMP. OF RAW

OTHER REMARKS Filtered on the 15, 16, 30, 31 Used 2,630 lbs. Ferric Chloride & 26,350 lbs. Lime

S.B.H. 5-0-26 ('48-25M)

OPERATION
PLANT
L TREATMENT

REPORT FOR EAST CHICAGO, IND. (CITY)

FOR MONTH OF MARCH 19--

SIGNED BY Lionel A. Leahn

AERATION ED LIQUOR			RETURN SLUDGE		SLUDGE DIGESTION												
SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—% G.D.	SUSP. SOLIDS P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X 1000	RAW SLUDGE TO DIGESTER—GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER °F	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
	2.0	8.60	3.65		0.06	21.0	4.8	65	98	7.1	28.2	30.8	21.0	0.8			
	3.0	8.92	3.60		0.16	18.0	2.6	46	97	6.9	27.4	29.4	18.0	1.0			
	2.6	8.77	3.60		0.17	21.0	4.6	55	99	7.1	25.7	20.4	21.0	1.8			
	2.8	8.88	3.76		0.04	18.0	5.5	58	98	7.0	26.3	32.1	18.0	1.8			
		8.77	3.79		0.04	21.0			98		27.1	26.8	18.0				
		8.82	3.75		0.03	18.0			98		30.3	33.9	18.0				
82	3.6	8.89	3.74	10610	0.06	18.0	3.5	47	96	7.1	35.6	33.6	18.0	1.8			
61	2.0	8.75	3.48	8150	0.12	21.0	6.4	63	97	7.1	36.4	31.8	21.0	1.8			
76	4.2	8.75	3.39	12410	0.14	18.0	5.8	61	97	7.2	34.1	40.0	21.0	1.8			
85	2.8	8.95	3.34	10650	0.11	21.0	9.0	73	97	7.2	29.7	29.5	21.0	3.3			
54	2.6	8.95	3.52	10360		18.0	5.6	54	97	7.2	29.8	28.9					
		8.82	3.43		0.10	21.0			97		34.3	31.4					
		8.84	3.50		0.03	18.0			97		29.8	35.3	18.0				
65	4.0	8.92	3.43	10900	0.06	21.0	5.6	60	97	7.1	31.4	31.5					
66	4.2	8.81	3.48	9800	0.06	21.0	4.5	59	97	7.2	38.0	40.1	21.0	7.3	28.3		
64	3.0	8.98	3.46	10210	0.08	18.0	4.9	54	97	7.3	37.9	43.7	18.0	3.0	21.4		
60	3.8	8.73	3.40	9130	0.05	21.0	2.7	54	97	7.3	37.0	44.0	21.0	0.6			
52	2.4	8.93	3.44	12540	0.04	21.0	4.7	65	96	7.3	36.0	44.0	18.0	4.7			
		9.02	3.41		0.13	21.0			95		28.0	21.0					
		9.02	3.46		0.07	18.0			94		35.0	39.0	18.0				
60	4.4	8.97	3.40	10870	0.06	21.0	5.1	52	94	7.3	36.7	35.4	21.0	0.5			
48	4.4	8.89	3.46	11070	0.04	21.0	6.0	56	95	7.4	37.2	38.8	21.0	2.8			
59	4.4	8.91	3.45	9480	0.05	18.0	4.3	66	95	7.3	32.4	39.7	18.0	4.3			
61	4.2	8.93	3.48	10310	0.03	21.0	4.3	64	95	7.2	40.4	37.9	21.0	0.2			
67	2.8	8.98	3.57	11950	0.25	18.0	4.7	61	96	7.4	30.5	39.8	18.0	0.6			
		8.93	3.45		0.01	18.0			96		37.2	38.2	18.0				
		8.94	3.41		0.08	24.0			96		39.1	42.8	30.0				
60	4.4	8.83	3.47	12060		30.0	5.0	67	97	7.3	43.3	46.0	30.0	2.6			
52	3.8	8.99	3.45	15030	0.10	30.0	5.8	63	96	7.2	42.7	44.3	30.0	2.8			
53	2.0	8.95	3.46	10820	0.05	36.0	5.2	56	96	7.1	43.7	51.2	36.0	2.8	22.1	7.5	5.4
58	4.2	8.89	3.49	10820	0.08	36.0	5.7	59	96	7.1	41.5	41.3			24.0	9.7	6.0
1188	77.6	275.3	108.74	210110	2.30	666.0	116.9	1360			1064.7	1122.4	552.0	45.3	118.8	17.2	11.4
63	3.4	8.88	3.51	9135	0.08	22.0	5.1	59	97	7.2	34.3	36.2	21.2	2.3	23.6	8.6	5.7

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 51°

TO 48 LBS. LIME

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	32	24
SECONDARY TREATMENT	58	66
OVERALL TREATMENT	90	90

DETENTION TIME HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.04	1.37	1.70
AERATION TANK	3.33	2.43	2.88
FINAL SETTLING TANK	3.01	2.02	2.52

SURFACE FLOW RATE GAL. SQ. FT. DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			862
FINAL SETTLING TANK			552

WEIR OVERFLOW RATE GAL. FT. OF WEIR DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			17244
FINAL SETTLING TANK			13800

EQUIV. POP. TREATED = 91,838
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C.F. AIR/GAL. SEW. TREATED	0.681
C.F. AIR LB. B.O.D. REMOVED IN SECONDARY TREATMENT	635
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	17.2

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S. DAY TO DIGESTER	
LBS. GARB. T.V.S. DAY TO DIGESTER	
TOT. LBS. VOL. SOL. DAY TO DIGESTER	
C.F. GAS PROD. DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL MO. $ ____

ELECTRICITY PURCHASED ____ K.W.H. $ ____

GAS PURCHASED ____ C.F. $ ____

CHEMICALS & SUPPLIES $ ____

MAINTENANCE $ ____

OTHER OPERATING COSTS $ ____

AMORTIZATION COSTS $ ____

PAYMENTS TO DEPRECIATION FUND $ ____

TOTAL $ ____

COST/M.G. SEW. TREAT. $ ____

COST/CAPITA/MO. $ ____

COST/1000 LB. B.O.D. REMOVED $ ____

REVENUE RECEIVED $ ____

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

ACTIVATED SLUDGE TYPE

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED: ALUM LBS/DAY	CHEMICALS USED: LIME LBS/DAY	CHEMICALS USED: FERRIC CHLORIDE LBS/DAY	RAW SEWAGE: pH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: pH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: pH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION: MIXED LIQUOR: SETTLEABLE SOLIDS IN 30 MINUTES	AERATION: MIXED LIQUOR: SUSP. SOLIDS—P.P.M.	AERATION: MIXED LIQUOR: SLUDGE INDEX	AERATION: MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION: MIXED LIQUOR: AIR USED IN AERATION MILLION CU. FT.	AERATION: RETURN SLUDGE: VOLUME—M.G.D.	AERATION: RETURN SLUDGE: SUSP. SOLIDS—P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Th				13.5					400	7.8	1.1	7.4	67	86	7.6	72	109	7.5	15	12	6.8		150	65	2320	2.8	8.87	3.47	9890
2	F				11.7				24		1.8	.3																8.88	3.46	
3	S				11.3																							8.89	3.38	
4	Su				10.7								7.3	16	46	7.6	41	62	7.7	9	5	7.4		140	57	2444	4.2	8.79	3.43	10910
5	M				15.2				24				7.3	141	217	7.4	94	182	7.5	15	11	6.4		140	69	2036	4.6	8.81	3.43	10920
6	T				13.5								7.3	149	202	7.7	101	178	7.7	15	5	7.2		150	55	2720	3.0	8.67	3.37	12970
7	W				13.0								7.3	144	210	7.5	86	171	7.7	15	9	6.8		150	64	2360	2.4	8.71	3.35	13770
8	Th				15.0								7.3	119	137	7.6	52	137	7.6	13	18	6.0		160	60	2648	1.8	8.85	3.37	15790
9	F				14.4																							8.82	3.43	
10	S				13.7																							8.58	3.34	
11	Su				13.0								7.2	126	93	7.6	71	111	7.6	15	14	7.2		130	56	2306	3.4	8.51	3.35	14350
12	M				13.6						5.0	.8	7.8	123	58	7.9	111	98	7.9	14	16	7.4		150	63	2380	4.2	9.83	3.44	16000
13	T				13.0						7.9	1.1	7.4	150	244	7.8	88	170	7.8	11	9	6.2		160	51	2740	4.0	9.87	3.37	14520
14	W				13.5						6.7	1.1	7.4	202	198	7.7	131	171	7.7	17	7	6.4		150	77	1936	2.4	9.83	3.49	12030
15	Th				12.2						1.4	.3																9.71	3.40	
16	F				11.9																							9.48	3.32	
17	S				11.9																							9.82	3.41	
18	Su				10.9								7.6	143	57	7.7	139	82	7.7	11	5	6.8		170	53	3200	3.8	9.86	3.32	14200
19	M				12.2						11.7	1.6																9.73	3.48	
20	T				13.7						12.0	1.6	7.4	107	97	7.6	112	114	7.6	10	7	5.8		140	49	2848	1.8	9.08	3.46	14360
21	W				13.5				27		12.4	1.7	7.4	200	243	7.5	123	104	7.6	13	6	6.8		140	23	2656	3.8	8.81	3.49	15630
22	Th				13.3								7.2	196	172	7.8	113	108	7.6	16	7	6.8		140	58	2408	4.4	8.79	3.46	9990
23	F				13.7								7.4			7.7			7.7			7.4					4.5	8.83	3.74	
24	S				14.8																							8.44	3.50	
25	Su				15.9									71	124		48	164		11	7			120	57	2112		8.82	3.74	10190
26	M				14.4								7.3	102	124	7.7	88	117	7.6	15	5	7.2		120	54	2208	4.2	8.82	3.56	11760
27	T				14.3								7.5	72	140	7.6	78	82	7.6	18	13	7.0		120	52	2292	4.2	8.72	3.74	9900
28	W				14.9								7.3	71	118	7.7	46	59	7.6	13	10	7.8		120	75	1744	3.6	8.85	3.71	9330
29	Th				14.6								7.5	148	66	7.7	62	37	7.6	10	10	6.2		130	74	1764	3.2	8.82	3.71	10260
30	F				13.1																							8.79	3.68	
31																														
TOTAL					402.2				75	12000	66.1	9.6		2367	2652		1646	2079		241	176							278.5	10440	238770
AVERAGE					13.4					400	7.3	1.1	7.4	128	140	7.7	87	109	7.6	13	9	6.8		141	60	2375	3.5	9.04	3.48	12567
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C		G	G		G			C
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12		12			12

*C=COMPOSITE; G=GRAB.

APPEARANCE OF ACTIVATED SLUDGE Light Brown (Good) IF BULKING, IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN 216 HRS QUANTITY OF DRY SLU

WEATHER CONDITIONS Aver. 47.7 Max 78° Min 29° AVERAGE TEMP. OF RA

OTHER REMARKS Not Chlorinating Because of Ruptured Line

S.B.H. 3-0-26 ('48-25M)

OPERATION

PLANT

YPE

REPORT FOR EAST CHICAGO, IND (CITY)

FOR MONTH OF April 1965

SIGNED BY Lowell A. Leahy

	AERATION MIXED LIQUOR			RETURN SLUDGE		SLUDGE DIGESTION												
	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X 1000	RAW SLUDGE TO DIGESTER—GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN—GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
5	2320	2.8	8.87	3.47	9890		36.0	5.2	2.8	95	7.1	479	537			31.9	7.1	67
			8.88	3.46		.049	36.0			93		45.5	49.1	36.0	5.1	15.1		
			8.89	3.38		.049	36.0			94		48.8	51.7	36.0	4.3			
	2444	4.2	8.79	3.43	10910	.021	36.0	5.6	5.0	93	7.2	45.7	50.2	36.0				
	2036	4.6	8.81	3.43	10920	.066	36.0	5.7	5.9	93	7.2	46.4	46.9	36.0				
	2720	3.0	8.67	3.37	12970	.118	36.0	5.8	5.2	94	7.3	41.0	49.0	36.0	3.4			
	2360	2.4	8.71	3.35	13770	.147	36.0	7.2	6.2	95	7.3	46.0	49.0	36.0	3.8			
	2648	1.8	8.85	3.37	15790	.107	36.0	5.5	5.2	95	7.3	49.0	51.0	36.0	3.8			
			8.82	3.43		.044	36.0			95		45.0	50.6	36.0				
			8.58	3.34		.119	36.0			95		45.6	48.8	36.0				
	2306	3.4	8.51	3.35	16350	.103	36.0	5.2	5.4	94	7.2	46.1	41.6	36.0	3.6			
	2380	4.2	9.83	3.44	16000	.059	36.0	4.7	4.8	95	7.3	42.0	54.0			33.0	7.8	5.8
	2740	4.0	9.87	3.37	14520	.143	36.0	5.3	4.0	93	7.3	42.8	46.7			39.0	6.5	3.8
	1936	2.4	9.83	3.49	12030	.041	36.0	6.6	5.8	94	7.2	43.1	50.8			37.3	6.5	4.3
			9.71	3.40		.092	36.0			92		39.1	40.9	36.0	1.7	22		
			9.48	3.32		.141	36.0			94		38.0	45.1	36.0				
			9.82	3.41		.109	36.0			93		25.8	48.6	36.0				
	3200	3.6	9.86	3.32	14200	.102	36.0	4.2	5.9	94		33.2	33.4	36.0				
			9.73	3.48		.089	36.0			93		34.3	52.5			23.8	5.8	5.0
	2848	1.6	9.08	3.46	14360		36.0	5.1	4.6	93	7.2	39.7	36.8			45.9	4.7	5.2
	2656	3.8	8.81	3.49	15630	.042	39.0	4.8	5.8	94	7.2	42.1	48.6			48.9		
	2405	4.4	8.79	3.46	9990	.049	36.0	5.4	5.6	94	7.1	42.8	43.8	36.0	0.2			
		4.5	8.83	3.74		.025	39.0			95	7.3	45.0	49.1	39.0				
			8.44	3.50		.091	36.0			95		45.1	49.2	36.0				
	2112		8.82	3.74	10190	.046	39.0	4.5	6.4	94		46.3	52.4	39.0	2.2			
	2208	4.2	8.82	3.56	11760	.174	36.0	4.4	5.2	96	7.3	37.0	40.0	36.0	4.2			
	2292	4.2	8.72	3.74	9900	.117	36.0	6.0	6.0	96	7.3	40.0	48.0	36.0	1.2			
	1744	3.6	8.85	3.71	9330	.075	36.0	5.6	6.3	97	7.3	40.0	39.0	36.0	1.4			
	1764	3.2	8.82	3.71	10260	.087	36.0	4.6	6.4	96	7.3	39.6	48.0	36.0	4.4			
			8.79	3.68		.087	36.0			97		37.1	41.9	36.0				
			278.5	104.40	238770	2.351	1.089.0					1245.0	1404.4			362.1		
	2375	3.5	9.04	3.48	12567	.084	36.3	5.3	5.4	95	7.3	41.8	46.8	36.0	3.0	34.7	6.4	5.1
		c			c			c	c		c	c	c	a	a	c	c	c
		12			12			12	12		1	1		1	1	12	12	12

IF BULKING, IN WHAT PERIOD None

QUANTITY OF DRY SLUDGE REMOVED None

AVERAGE TEMP. OF RAW SEWAGE 54

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	30	22
SECONDARY TREATMENT	60	72
OVERALL TREATMENT	90	94

DETENTION TIME HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.14	1.51	1.82
AERATION TANK	3.45	2.58	3.01
FINAL SETTLING TANK	3.15	2.22	2.69

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			889
FINAL SETTLING TANK			569

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			12,772
FINAL SETTLING TANK			14,225

EQUIV. POP. TREATED = 82,206
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C.F. AIR/GAL. SEW. TREATED	0.674
C.F. AIR LB. B.O.D. REMOVED IN SECONDARY TREATMENT	722
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	19.2

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD./DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO.	$ 4,485.09
ELECTRICITY PURCHASED ____ K.W.H.	$ 907.35
GAS PURCHASED ____ C.F.	$ 266.61
CHEMICALS & SUPPLIES	$ 270.00
MAINTENANCE Fuel Oil	$ 840.49
OTHER OPERATING COSTS	$
AMORTIZATION COSTS	$
PAYMENTS TO DEPRECIATION FUND	$
TOTAL	$ 6,769.53
COST/M.G. SEW. TREAT.	$ 16.84
COST/CAPITA/MO.	$ 0.119
COST/1000 LB. B.O.D. REMOVED	$ 18.00
REVENUE RECEIVED	$

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

GUGGENHEIM BIOCHEMICAL TREATMENT

ACTIVATED SLUDGE TYPE

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED LBS/DAY	CHEMICALS USED LBS/DAY	CHEMICALS USED LBS/DAY	RAW SEWAGE pH	RAW SEWAGE 5-DAY B.O.D.—P.P.M.	RAW SEWAGE SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT pH	PRIMARY EFFLUENT 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT pH	FINAL EFFLUENT 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT RESIDUAL CHLORINE—P.P.M.	AERATION MIXED LIQUOR SETTLEABLE SOLIDS IN 30 MINUTES	AERATION MIXED LIQUOR SUSP. SOLIDS—P.P.M.	AERATION MIXED LIQUOR SLUDGE INDEX	AERATION MIXED LIQUOR DISSOLVED OXYGEN—P.P.M.	AERATION MIXED LIQUOR AIR USED IN AERATION MILLION CU. FT.	AERATION RETURN SLUDGE VOLUME—M.G.D.	AERATION RETURN SLUDGE SUSP. SOLIDS P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL.
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	S				13.2							.60																8.72	3.72		.097
2	Su				9.2								7.4	20	54	7.7	12	64	7.6	14	5	7.4		.130	3272	40	3.8	8.66	3.82	10010	.091
3	M				9.0								7.3	146	173	7.7	27	47	7.6	15	15	7.0		.115	2070	56	3.4	8.65	3.82	9910	.030
4	T				14.9								7.4	108	238	7.6	42	82	7.5	16	13	7.0		.120	1932	62	3.4	8.78	3.79	13640	
5	W				13.9				27				7.3	162	90	7.5	54	53	7.5	5	2	6.8		.130	2130	61	2.6	8.63	3.75	11580	.050
6	Th				14.8								7.4	34	46	7.6	32	37	7.6	3	6	6.2		.130	2124	61	2.6	8.63	3.81	18030	.070
7	F				14.1				27																			8.56	3.82		.060
8	S				13.3																							8.50	3.82		.040
9	Su				12.4								7.3	15	44	7.8	17	21	7.8	2	3	7.2		.110	1540	71	4.2	8.79	3.78	7360	
10	M				13.2				54				7.5	99	84	7.7	95	45	7.7	15	13	6.4		.120	1700	71	3.0	8.80	3.79	8500	
11	T				12.8								7.8	67	69	7.5	64	75	7.5	14	5	5.4		.130	1848	70	2.4	8.78	3.84	8840	
12	W				11.8				14				7.5	145	76	7.8	30	51	7.8	10	7	7.0		.130	1200	108	3.4	8.66	3.77	4000	
13	Th				12.0								7.5	74	64	7.7	49	39	7.8	15	6	5.8		.120	2020	29	3.6	8.76	3.78	5870	
14	F				12.8				27																			8.65	3.81		
15	S				13.9																							8.70	3.84		
16	Su				12.1								7.5	45	62	7.7	19	26	7.7	3	2	7.0		.130	1976	66	3.8	8.67	3.78	4540	
17	M				11.7				54				7.5	73	62	7.8	40	37	7.8	11	6	7.2		.130	1732	75	2.8	8.75	3.77	5280	
18	T				12.0								7.5	56	122	7.6	24	42	7.6	13	11	7.0		.130	1744	75	1.6	8.67	3.81	5230	
19	W				12.0				27				7.5	60	60	7.7	33	48	7.8	3	9	7.0		.130	2128	61	4.0	8.80	3.75	5580	
20	Th				11.3								7.5	62	92	7.8	51	56	7.7	13	14	5.4		.140	1972	71	1.0	9.30	3.84	6050	
21	F				12.0																							9.62	3.76		
22	S				10.7				14																			9.74	3.74		
23	Su				11.1								7.3	44	58	7.7	22	24	7.6	13	5	7.2		.130	1560	83	1.6	9.65	3.76	6620	.105
24	M				12.7				27				7.7	208	173	7.7	34	34	7.6	15	2	6.2		.130	1780	73	1.0	9.41	3.80	7480	.085
25	T				12.5								7.3	83	70	7.6	44	25	7.6	20	2	6.4		.150	1854	81	3.4	9.53	3.74	9020	.080
26	W				12.3				27				7.3	166	320	7.6	50	42	7.6	20	13	7.0		.115	1436	80	3.6	9.47	3.77	5570	.120
27	Th				11.1								7.4	52	90	7.8	34	51	7.8	19	7	6.4		.115	1360	85	2.8	9.60	3.74	5210	.140
28	F				10.7								7.9	70	99	7.9	31	47	7.7	18	6	4.0		.110	1396	79	4.2	9.80	3.73	6910	.120
29	S				10.1				54				7.6	77	123	7.7	57	39	7.5	10	9	1.0		.120	1880	64	1.2	9.82	3.69	9300	.050
30	Su				9.3																							9.78	3.71		.100
31	M				10.4								7.3	55	65	7.7	24	21	7.7	16	10	1.8		.130	1952	67	1.6	9.67	3.72	7790	.120
TOTAL					373.3				352					1921	2334		882	1046		283	269				42598			286.60	113.32	182400	1.350
AVERAGE					12.1				11			.400	7.5	84	102	7.7	38	46	7.7	12	10	6.1		.116	1852	70	2.8	9.05	3.66	7930	.045
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C		C	C	C	C			C	
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12	12	12			12	

*C = COMPOSITE; G = GRAB.

APPEARANCE OF ACTIVATED SLUDGE Good Light Brown ... IF BULKING, IN WHAT PER

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None ... QUANTITY OF DRY SLUD

WEATHER CONDITIONS Aver. 64.0° Hig. 82° Low 37° ... AVERAGE TEMP. OF RAW S

OTHER REMARKS Not chlorinating because of a ruptured line

S.B.H. 5-0-26 ('48-25M)

OPERATION
TREATMENT

E

REPORT FOR EAST CHICAGO INDIANA (CITY)

FOR MONTH OF MAY 1965

SIGNED BY

AERATION ED LIQUOR				RETURN SLUDGE		SLUDGE DIGESTION												
	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X 1000	RAW SLUDGE TO DIGESTER—GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN—GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
			8.72	3.72		.094	36.0			97				36.0				
	40	3.8	8.44	3.82	10010	.091	36.0	5.4	82	95	7.3			36.0	2.1			
	56	3.4	8.65	3.82	9990	.030	39.0	4.5	59	96	7.3			39.0	1.6			
	62	3.4	8.78	3.79	13640		36.0	4.8	60	96	7.2			36.0	4.0			
	61	2.6	8.63	3.75	11580	.050	39.0	6.9	27	95	7.5			39.0	4.0			
	61	2.6	8.63	3.81	18030	.070		5.2	52	97	7.2				4.0			
			9.56	3.82		.060				96								
			8.52	3.82		.040				96								
	71	4.2	8.79	3.78	7360					96								
	71	3.0	8.80	3.79	8500					96								
	70	2.4	8.78	3.84	8840					96								
	108	3.4	8.66	3.77	4000					98								
	39	3.6	8.76	3.78	5870					98								
			8.65	3.81						98								
			8.70	3.84						96								
	66	3.8	8.67	3.78	4540					97								
	75	2.8	8.78	3.77	5280					97								
	75	1.6	8.67	3.81	5230					98								
	61	4.0	8.80	3.75	5580		.50			95		3.7	.08					
	71	1.0	9.30	3.84	6050		.80			98		5.1	2.8			90		
			9.62	3.76			2.40			96		7.7	3.5					
			9.74	3.74			36.0			96		13.2	7.3					
	83	1.6	9.65	3.76	6620	.102	36.0	4.1	70	96		15.6	8.3					
	73	1.0	9.41	3.80	7480	.084	36.0	1.4	38	96		21.0	14.2					
	81	3.4	9.53	3.74	9020	.080	30.0	3.5	38	96	7.2	22.5	12.6	30.0				
	80	3.6	9.47	3.77	5570	.120	36.0	4.8	70	92	7.2	22.5	7.3	36.0				
	85	2.8	9.60	3.74	5210	.140	36.0	2.9	71	92	7.2	21.7	12.7			45.0		
	79	4.2	9.80	3.73	6910	.120	36.0	1.6	48	93	7.3	20.3	9.8					
	64	1.2	9.82	3.69	9300	.092	36.0			92	7.3	21.7	12.7			45.0		
			9.78	3.71		.100	33.0			93		22.3	21.2					
32	67	1.6	9.67	3.72	7790	.120	12.0	2.3	55	92	7.2	29.6	29.2			36.0		
98			286.60	113.32	182400	1.393	576.0					226.9	143.3	262.0		135.0		
32	70	2.8	9.05	3.66	7930	.044	31.7	4.0	57	96	7.3	17.5	11.1	36.0	3.1	33.8		
	c	c			c			c	c		c	c	c	c	c	c		
	12	12			12			12	12		1	1	1	1	1	12		

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 60°

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	55	54
SECONDARY TREATMENT	31	36
OVERALL TREATMENT	86	90

DETENTION TIME HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.55	1.55	1.89
AERATION TANK	3.81	2.61	3.12
FINAL SETTLING TANK	4.75	2.28	2.82

SURFACE FLOW RATE GAL. SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			802
FINAL SETTLING TANK			514

WEIR OVERFLOW RATE GAL. FT. OF WEIR DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			16,047
FINAL SETTLING TANK			12,845

EQUIV. POP. TREATED = 49,863
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.748
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1,245
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	31.6

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S. DAY TO DIGESTER	
TOT. LBS. VOL. SOL. DAY TO DIGESTER	
C.F. GAS PROD./DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO. $ 4,696.07

ELECTRICITY PURCHASED ____ K.W.H. $ 417.38

GAS PURCHASED ____ C.F. $ 247.85

CHEMICALS & SUPPLIES $

MAINTENANCE Fuel oil $ 395.20

OTHER OPERATING COSTS $

AMORTIZATION COSTS $

PAYMENTS TO DEPRECIATION FUND $

TOTAL $ 6,453.71

COST/M.G. SEW. TREAT. $ 17.29

COST/CAPITA/MO. $ 0.13

COST/1000 LB. B.O.D. REMOVED $ 24.55

REVENUE RECEIVED $

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

ACTIVATED SLUDGE TYPE

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED: ALUM LBS/DAY	CHEMICALS USED: CHLORINE LBS/DAY	CHEMICALS USED: LBS/DAY	RAW SEWAGE: pH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: pH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: pH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION: MIXED LIQUOR: SETTLEABLE SOLIDS % IN 30 MINUTES	AERATION: MIXED LIQUOR: SUSP. SOLIDS—P.P.M.	AERATION: MIXED LIQUOR: SLUDGE INDEX	AERATION: MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION: MIXED LIQUOR: AIR USED IN AERATION MILLION CU. FT.	AERATION: RETURN SLUDGE: VOLUME—M.G.D.	AERATION: RETURN SLUDGE: SUSP. SOLIDS—P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	F				12.2				54	400	400		7.8	117	82	7.9	37	40	7.8	11	9	6.2		120	1720	70	0.8	8.70	3.69	8300
2	W				11.7					400	400		7.7	45	70	7.7	27	36	7.6	3	16	6.4	0.6	135	1880	66	1.0	8.83	3.12	6900
3	Th				10.5					400	400		7.5	123	181	7.5	36	39	7.6	9	13	5.4	0.4	130	2072	63	1.0	8.79	3.99	6630
4	F				10.3				14	400	400																	8.94	4.14	
5	S				11.1					400	400																	8.62	4.16	
6	Su				10.3					400	400		7.5	92	86	7.5	39	34	7.5	3	7	6.1	1.3	130	1868	70	1.0	8.41	3.98	6210
7	M				10.6				54	400	400		7.6	82	53	7.6	74	23	7.5	2	4	7.0	1.0	140	1840	76	1.0	8.98	3.64	7320
8	T				12.1					400	400		7.4	70	118	7.5	55	44	7.5	1	3	6.8	0.9	150	1912	78	1.0	8.72	3.63	8400
9	W				10.2				27	400	400		7.5	62	79	7.6	33	34	7.5	1	0	6.8	0.7	180	2408	75	1.2	8.22	3.59	6830
10	Th				10.7					400	400		7.5	103	220	7.5	32	30	7.6	0	3	5.6	0.8	150	1972	76	0.8	8.84	3.65	6720
11	F				11.5				15	400	400												1.2					8.50	3.70	
12	S				10.4					400	400																	8.72	3.66	
13	Su				8.9					400	400		7.4	29	32	7.5	29	31	7.3	2	11	6.8		140	1748	80	1.2	8.94	3.66	5000
14	M				9.4				54	400	400			43	75	7.4	29	57	7.5	1	13	7.0	1.0	155	1792	86	2.6	8.65	3.67	5460
15	T				9.3					400	400		7.4	68	140	7.5	36	50	7.2	2	6	6.8	1.3	140	1676	84	2.2	8.85	3.69	4120
16	W				9.9					400	400		7.3	58	80	7.4	31	43	7.1	0	2	7.4	1.4	150	1492	101	2.6	8.88	3.64	4570
17	Th				10.4					400	400		7.4	109	156	7.5	35	65	7.2	1	3	5.8	1.2	145	1624	84	1.2	8.88	3.69	4590
18	F				11.3					400	400												1.2					9.00	3.73	
19	S				10.4					400	400																	8.72	3.65	
20	Su				10.0				54	400	400		7.4	165	203	7.4	35	42	7.4	1	4	6.4		170	1800	94	1.8	8.68	3.66	5930
21	M				10.5					400	400		7.4	64	68	7.5	48	61	7.3	1	3	6.4	1.0	160	1700	94	1.0	8.77	3.74	6150
22	T				11.6					400	400		7.2	62	104	7.3	35	78	7.2	1	4	3.6	1.1	130	1760	74	1.2	8.81	3.72	6610
23	W				11.4				54	400	400		7.5	23	54	7.5	34	22	7.1	1	6	5.6	1.0	160	1636	98	1.4	8.71	3.63	6870
24	Th				10.3					400	400		7.5	25	209	7.5	34	58	7.4	2	1	6.4	1.2	150	1912	78	1.6	8.90	3.67	6110
25	F				10.7				54	400	400												1.0					8.63	3.64	
26	S				10.3					400	400																	8.73	3.66	
27	Su				10.4					400	400		7.2	52	56	7.3	26	40	7.3	1	2	6.4		130	1700	76	1.4	8.53	3.69	6070
28	M				11.0				27	400	400		7.0	72	74	7.8	39	40	7.4	0	2	6.0	1.4	140	1836	76	1.2	8.71	3.64	6160
29	T				10.5					400	400		7.0	47	79	7.4	37	55	7.4	0	12	6.2	1.1	150	1928	78	1.4	8.60	3.67	7560
30	W				10.4				27	400	400		7.1	134	178	7.4	51	48	7.4	.1	6	6.6	1.2	140	1904	74	1.4	8.86	3.65	6140
31					3																									
TOTAL					318.5				434					1645	2396		852	970		44	129			3185	40180	[illegible]		2623	103.7	138450
AVERAGE					10.6				15	400	400		7.4	75	109	7.5	39	44	7.4	2	6	6.3	1.1	145	1824	80	[illegible]	8.74	3.46	6293
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C	G	C	C	C	C			C
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12	2	12	12	12	12			12

*C = COMPOSITE; G = GRAB.

APPEARANCE OF ACTIVATED SLUDGE: VERY GOOD ... IF BULKING, IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN: NONE ... QUANTITY OF DRY SL

WEATHER CONDITIONS: AVE. 68.9° HIGH 94° LOW 48° ... AVERAGE TEMP. OF RA

OTHER REMARKS: #1 PRIMARY TANK OUT OF SERVICE FOR REPAIRS FROM THE 16TH TO THE 30TH.

S.B.H. 5-0-26 ('48-25M)

OPERATION
PLANT
E

REPORT FOR EAST CHICAGO, IND. (CITY)

FOR MONTH OF JUNE 1965

SIGNED BY Lowell A. Leahu

AERATION ED LIQUOR			RETURN SLUDGE		SLUDGE DIGESTION												
SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X1000	RAW SLUDGE TO DIGESTER—GAL. X1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F.	pH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN—GAL. X 1000	SOLIDS IN SUPERNATANT %	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
70	0.8	8.70	3.69	8300	.051	27.0	6.7	68	96	7.4	33.0	25.3	24.0				
66	1.0	8.83	3.12	6900	.063	39.0	7.8	66	95	7.3	29.3	23.4	39.0				
63	1.0	8.79	3.99	6630	.053	33.0	3.4	69	95	7.1	31.7	32.9	33.0		21.0		
		8.94	4.14		.050	36.0			97		18.3	10.4	33.0		39.0		
		8.62	4.16		.006	36.0			97		29.7	24.0	36.0				
70	1.0	8.41	3.98	6210	.123	36.0	4.8	57	97	7.2	26.9	20.1	36.0	2.9			
76	1.0	8.98	3.64	7320	.082	24.0	5.7	56	96	7.3	24.4	20.3	33.0	1.9			
78	1.0	8.72	3.63	8400	.070	12.0	3.0	53	95	7.3	28.2	19.0	36.0	1.6			
75	1.2	8.22	3.59	6830	.082	45.0	4.0	63	94	7.2	16.5	14.7	30.0				
76	0.8	8.84	3.65	6720	.045	27.0	4.3	70	96	7.2	29.9	28.7	36.0	1.6			
		8.50	3.70		.094	30.0			95		41.7	49.0	18.0				
		8.72	3.66		.064	36.0			94		38.6	23.9	36.0				
80	1.8	8.94	3.66	5000	.100	36.0	3.5	65	95	7.1	45.5	40.9	36.0	1.6			
86	2.6	8.65	3.67	5460	.040	36.0	3.4	61	95	7.1	49.6	58.9	42.0	0.6			
84	2.8	8.85	3.69	4120	.052	36.0	4.3	75	95	7.1	47.6	37.3	36.0	1.0			
101	2.6	8.88	3.64	4570	.053	38.0	2.3	90	93	7.1	54.0	63.0	00.0	2.8			
84	1.2	8.88	3.69	4590	.123	36.0	1.4	57	96	7.2	47.9	35.0	36.0				
		9.00	3.73		.066	39.0			96		40.1	52.6	33.0				
		8.72	3.65		.061	36.0			97		49.7	52.6	36.0				
94	1.8	8.68	3.66	5930	.049	33.0	3.3	69	96	7.1	47.8	40.4	36.0				
94	1.0	8.77	3.74	6150	.100	36.0	7.1	59	96	7.1	45.8	44.1	33.0	1.6			
74	1.2	8.81	3.72	6610	.044	36.0	5.6	54	95	7.1	50.7	48.4	00.0	0.7			
98	1.4	8.71	3.63	6870	.060	45.0	4.5	64	98	7.2	52.0	54.7	00.0	0.6			
78	1.6	8.90	3.67	6110	.121	39.0			96	7.1	47.7	55.2	48.0		33.0		
		8.69	3.64		.044	33.0			96		40.0	33.0	00.0		45.0		
		8.73	3.66		.134	48.0			96		37.3	36.7	00.0				
76	1.4	8.53	3.69	6070	.120	39.0	3.9	53	93	7.1	35.6	43.0	00.0	2.1	39.0		
76	1.2	8.71	3.64	6160	.088	39.0	4.6	55	92	6.9	31.4	31.6	00.0		39.0		
78	1.4	8.60	3.67	7560	.104	36.0	2.1	80	95		40.8	24.4	00.0		36.0		
74	1.4	8.86	3.65	6140	.140	39.0	3.9	53	95		42.2	48.2	00.0		39.0		
175		262.3	103.7	138450	2329	1062.0	89.8	1337			1154	1094	7260		291.0		
80	1.4	8.74	3.46	6293	.079	35.4	4.3	64	95	7.2	38.5	36.5	34.0	1.6	9.7		
c	c			c			c	c		c	c	c	c	c	c		
12	12			12			12	12							12		

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 65°

TO TO THE 30TH.

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	50	51
SECONDARY TREATMENT	47	44
OVERALL TREATMENT	97	95

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.06	1.32	1.81
AERATION TANK	3.89	3.07	3.82
FINAL SETTLING TANK	3.80	2.77	3.20

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			703
FINAL SETTLING TANK			450

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			14058
FINAL SETTLING TANK			11253

EQUIV. POP. TREATED = 39,000
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.825
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1,390
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	42.6

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD./DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO. $ 5,278.04

ELECTRICITY PURCHASED ____ K.W.H. $ 4,176.97

GAS PURCHASED ____ C.F. $ 188.65

CHEMICALS & SUPPLIES $ ____

MAINTENANCE FUEL OIL $ 395.20

OTHER OPERATING COSTS $ ____

AMORTIZATION COSTS $ ____

PAYMENTS TO DEPRECIATION FUND $ ____

TOTAL $ 7,038.86

COST/M.G. SEW. TREAT. $ 22.06

COST/CAPITA/MO. $ 0.123

COST/1000 LB. B.O.D. REMOVED $ 27.93

REVENUE RECEIVED $ ____

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

ACTIVATED SLUDGE TYPE

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED: CHLORINE LBS/DAY	CHEMICALS USED: ALUM LBS/DAY	CHEMICALS USED: LBS/DAY	RAW SEWAGE: PH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: PH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: PH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION: MIXED LIQUOR: SETTLEABLE SOLIDS % IN 30 MINUTES	AERATION: MIXED LIQUOR: SUSP. SOLIDS—P.P.M.	AERATION: MIXED LIQUOR: SLUDGE INDEX	AERATION: MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION: AIR USED IN AERATION MILLION CU. FT.	RETURN SLUDGE: VOLUME—M.G.D.	RETURN SLUDGE: SUSP. SOLIDS—P.P.M.
1	2				5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Th				10.7					400	400		7.3	89	69	7.4	44	52	7.3	0	9	4.0	1.3	160	1956	82	1.6	8.69	3.71	6720
2	F				10.2				27	400	400												1.2					8.54	3.68	
3	S				9.5					400	400																	8.62	3.71	
4	Su				8.6					400	400																	8.82	3.68	
5	M				8.7					400	400		7.4	56	152	7.4	57	83	7.4	2	4	4.8		135	1560	87	1.8	8.67	3.54	5800
6	T				11.9				54	400	400		7.2	96	120	7.4	32	74	7.3	4	5	4.6	0.8	140	1852	72	3.6	8.67	3.76	6260
7	W				11.6				18	400	400		7.3	81	121	7.3	21	47	7.4	2	9	4.2	0.8	130	2072	63	3.0	8.72	3.64	6750
8	Th				12.5					400	400																	8.58	3.78	
9	F				10.6				54	400	400																	9.20	3.64	
10	S				10.3					400	400																	9.59	3.74	
11	Su				8.9					400	400																	8.54	3.64	
12	M				10.7				27	400	400																	8.54	3.73	
13	T				12.7					400	400																	9.19	3.73	
14	W				10.5				27	400	400																	8.83	3.64	
15	Th				10.7					400	400																	9.21	3.59	
16	F				11.2					400	400																	9.45	3.59	
17	S				10.5				27	400	400																	9.50	3.76	
18	Su				9.2					400	400																	9.52	3.72	
19	M				10.9				21	400	400																	8.48	3.68	
20	T				11.3					400	400																	8.70	3.65	
21	W				7.5				27	400	400																	8.82	3.74	
22	Th				11.2					400	400																	8.60	3.72	
23	F				10.8					400	400																	8.49	3.67	
24	S				10.1				27	400	400																	8.42	3.54	
25	Su				8.6					400	400		7.2	25	55	7.2	22	24	7.1	0	4	4.4		150	2180	69	1.0	8.61	3.61	6640
26	M				10.5				27	400	400		7.4	49	77	7.4	42	50	7.3	1	10	3.8	1.2	130	2012	65	0.8	8.73	3.57	6730
27	T				10.2					400	400		7.2	46	109	7.2	41	65	7.3	1	20	4.8		140	2104	67	1.0	8.66	3.61	8080
28	W				10.2				27	400	400		7.3	83	77	7.3	33	35	7.2	3	2	4.6		140	2300	61	1.0	8.67	3.62	7350
29	Th				10.0					400	400		7.3	69	91	7.3	47	36	7.3	2	5	3.8		160	2220	72	0.8	8.82	3.72	8120
30	F				10.1					400	400												1.3					8.66	3.76	
31	S				9.5					400	400																	8.67	3.66	
TOTAL					320.8				363				661	614	871	659	339	466	656	15	48	390			18256	638	14.6	273.4	113.8	62450
AVERAGE					10.4				11.7	400	400		7.3	68	98	7.4	38	52	7.3	2	8	4.4		142	2028	71	1.6	8.82	3.67	6940
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C	G	C	C	C	C			C
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12	1	12	12	12	12			12

*C=COMPOSITE: G=GRAB.

APPEARANCE OF ACTIVATED SLUDGE Good, Light Brown IF BULKING, IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None QUANTITY OF DRY SLU

WEATHER CONDITIONS Aver. 72.7° Hi 94° Low 50° AVERAGE TEMP. OF RA

OTHER REMARKS None Chemist on vacation from the 7th to 25th

S.B.H. 5-0-26 ('48-25M)

OPERATION
PLANT
TYPE

REPORT FOR EAST CHICAGO, IND. (CITY)

FOR MONTH OF JULY 1965

SIGNED BY Conrad C. Lusher

	AERATION — MIXED LIQUOR				RETURN SLUDGE		SLUDGE DIGESTION													
	SUSP. SOLIDS—P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X 1000	RAW SLUDGE TO DIGESTER—GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN—GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
	756	82	1.6	8.69	3.71	6720	.110	33.0	3.4	61	96	7.1	26.7	31.9			35.0		
				8.54	3.68		.084	24.0			96		20.7	14.7			30.0		
				8.62	3.71		.065	30.0			96		14.9	18.4	30.0				
				8.82	3.68		.102	30.0			96		14.9	13.3	30.0				
	6.0	87	1.8	8.67	3.54	5800	.137	36.0	3.4	75	93	7.1	40.6	41.9	36.0	1130			
	652	72	3.6	8.67	3.76	6260	.030	39.0	3.4	100	94	7.1	21.2	24.8		580	39.0		
	772	63	3.0	8.72	3.64	6750	.119	42.0	1.7	50	93	7.1	40.1	39.6			42.0		
				8.58	3.78		.069	36.0			93		32.0	36.2			45.0		
				9.20	3.64		.044	33.0			96		37.8	40.9					
				9.59	3.74		.094	30.0			96		38.1	36.0			30.0		
				8.54	3.64		.154	36.0			95		28.6	24.9			36.0		
				8.54	3.73		.042	33.0			96		31.6	32.7	30.0				
				9.19	3.73		.043	33.0			96		31.1	13.6	33.0				
				8.83	3.64		.125	36.0			96		36.6	27.7	30.0				
				9.21	3.59		.105	42.0			97		34.1	23.6			42.0		
				9.45	3.59		.157	33.0			93		30.0	25.1	39.0				
				9.50	3.76		.000	36.0			96		26.4	23.5	24.0				
				9.32	3.72		.043	33.0			96		35.8	41.1			33.0		
				8.48	3.68		.124	36.0			96		39.8	41.6			36.0		
				8.70	3.65		.120	33.0			95		38.8	33.1			36.0		
				8.82	3.74		.110	39.0			95		29.1	45.2	36.0				
				8.60	3.72		.140	36.0			95		38.1	41.0	36.0				
				8.69	3.67		.000	39.0			93		38.2	37.8	36.0				
				8.42	3.54		.110	36.0			95		10.4	12.8	36.0				
	8.0	69	1.0	8.61	3.61	6640	.145	36.0	2.7	54	96	7.0	36.0	35.3	36.0				
	18	65	0.8	8.73	3.57	6730	.122	36.0	3.9	68	96	7.0	56.8	55.5	36.0				
	4	67	1.0	8.66	3.61	8080	.084	36.0	4.1	80	97	6.9	30.0	29.9	36.0				
	00	61	1.0	8.67	3.62	7350	.135	39.0	2.6	85	97	7.0	12.2	11.7			36.0		
	0	72	0.8	8.82	3.72	8120	.056	36.0	2.7	55	95	7.0	24.0	23.8	36.0		36.0		
				8.66	3.74		.053	39.0			96		28.3	20.6	39.0		39.0		
				8.67	3.66		.032	36.0			92		28.2	26.2	36.0		36.0		
	56	638	14.6	273.4	113.8	62450	2.748	1092	27.9	628			944.6	926.4	615.0	1710	549.0		
	8	71	1.6	8.82	3.67	6940	.095	35.2	3.1	70	95	7.0	30.5	29.9	34.2	855	17.7		
		c	c			c			c	c		c	c	c	c	c	c		
	3	12	12			12			12	12		1	1	1	1	1	1		

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	44	47
SECONDARY TREATMENT	53	52
OVERALL TREATMENT	97	92

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	3.03	1.23	2.91
AERATION TANK	4.25	2.71	3.51
FINAL SETTLING TANK	4.25	2.49	3.39

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			689
FINAL SETTLING TANK			441

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			13,793
FINAL SETTLING TANK			11,040

EQUIV. POP. TREATED = 34,405
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.848
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1,554
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	45.8

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD./DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ___ PAYROLL/MO.	$ 5,062.84
ELECTRICITY PURCHASED ___ K.W.H.	$ 1,208.07
GAS PURCHASED ___ C.F.	$ 182.45
CHEMICALS & SUPPLIES	$
MAINTENANCE FUEL OIL	$ 395.20
OTHER OPERATING COSTS	$
AMORTIZATION COSTS	$
PAYMENTS TO DEPRECIATION FUND	$
TOTAL	$ 6,848.56
COST/M.G. SEW. TREAT.	$ 21.33
COST/CAPITA/MO.	$ 0.120
COST/1000 LB. B.O.D. REMOVED	$ 36.23
REVENUE RECEIVED	$

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

ACTIVATED SLUDGE TYPE

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED: ALUM LBS/DAY	CHEMICALS USED: CHLORINE LBS/DAY	CHEMICALS USED: LBS/DAY	RAW SEWAGE: pH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: pH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: pH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION: MIXED LIQUOR: SETTLEABLE SOLIDS C. IN 30 MINUTES	AERATION: MIXED LIQUOR: SUSP. SOLIDS—P.P.M.	AERATION: MIXED LIQUOR: SLUDGE INDEX	AERATION: MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION: MIXED LIQUOR: AIR USED IN AERATION MILLION CU. FT.	AERATION: RETURN SLUDGE: VOLUME—M.G.D.	AERATION: RETURN SLUDGE: SUSP. SOLIDS—P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Su				8.8					400	400		7.1	41	99	7.4	24	37	7.2	•	9	5.8		130	2090	63	1.0	8.77	3.72	8660
2	M				10.2				54	400	400		7.0	59	79	7.4	94	28	7.4	1	10	6.8	0.5	145	2152	67	0.8	8.75	3.71	8220
3	T				11.8					400	400		7.2	37	73	7.3	46	24	7.2	0	12	6.0	1.3	135	2000	68	0.8	8.71	3.73	7750
4	W				10.9				27	400	400		7.2		58	7.3		36	7.5		6	6.0	1.5	140	2160	65	1.8	8.65	3.77	7790
5	Th				10.8					400	400		7.2	55	90	7.3	38	53	7.1	0	2	5.2	1.2	135	2156	63	1.0	8.71	3.77	8380
6	F				11.3				27	400	400												1.2					8.68	3.75	
7	S				10.0					400	400																	8.65	3.06	
8	Su				10.8					400	400		6.8	56	143	7.5	40	39	7.2	12	6	6.0		130	1764	74	0.8	9.32	3.77	7890
9	M				14.5					400	400		7.0	37	71	7.2	53	33	7.1	2	4	5.2	0.3	120	1624	74	1.0	8.72	3.75	8670
10	T				10.9				54	400	400		7.0	163	190	7.2	39	21	7.3	0	2	5.8	1.1	150	2300	65	1.0	8.75	3.67	8760
11	W				10.5					400	400		7.2	49	70	7.5	36	34	7.3	0	9	5.6	1.2	135	1576	86	1.0	8.75	3.66	8500
12	Th				11.0				27	400	400		7.1	74	97	7.2	38	59	7.1	0	4	5.8	1.9	140	2028	69	0.8	8.75	3.67	9460
15	13 F				12.0				14	400	400		7.1	36	69	7.3	18	37	7.3	0.5	3	5.0	1.2	135	2168	62	1.2	8.47	3.69	7010
16	14 S				10.6					400	400		7.0	189	254	7.4	43	27	7.4	0.7	1	5.8		140	1912	73	1.0	8.95	3.79	6440
	15 Su				10.2					400	400																	8.69	3.70	
	16 M				11.0				27	400	400												0.8					8.48	3.75	
17	T				13.0				14	400	400		7.4	30	98	7.5	21	39	7.4	7	7	6.1	0.6	135	1960	69	1.0	8.63	3.73	9200
18	W				12.8				81	400	400		7.2	26	52	7.4	23	16	7.3	0.5	6	6.6	1.0	140	1868	75	1.0	8.66	3.76	7830
19	Th				11.3					400	400		7.1	36	68	7.4	35	39	7.3	0.2	4	5.8	0.8	140	2488	56	1.6	8.70	3.78	7160
20	F				11.0				27	400	400												1.0					8.75	3.79	
21	S				10.1					400	400																	8.71	3.83	
22	Su				10.2					400	400		7.5	66	113	7.5	12	20	7.3	5	6	5.4		145	2060	70	2.6	9.36	3.82	8220
23	M				10.2				14	400	400		7.2	107	201	7.5	37	40	7.3	0.1	4	5.2	0.6	150	2852	53	1.2	9.65	3.64	5620
24	T				11.5					400	400		7.2	39	69	7.4	36	35	7.2	0	2	4.2	1.6	180	2076	63	1.2	9.01	3.70	7110
25	W				11.6				27	400	400		7.3	71	153	7.4	39	36	7.3	1	1	6.6	1.3	130	1752	74	1.2	9.64	3.75	8320
26	Th				14.9					400	400		7.2	88	66	7.4	37	37	7.3	0.1	8	5.4	1.4	150	1952	77	1.2	10.48	3.74	8870
27	F				13.2				27	400	400												0.8					9.47	3.83	
28	S				12.1					400	400																	8.70	3.66	
29	Su				10.9					400	400		7.2	33	40	7.3	23	27	7.2	0	9	5.0		160	2076	77	3.0	9.69	3.73	7040
30	M				14.7					400	400		7.2	36	66	7.3	34	52	7.2	2	8	5.8	0.7	135	1780	76	4.6	9.50	3.65	6900
31	T				13.5					400	400		7.1	26	46	7.1	24	41	7.2	.3	8	6.2	1.3	140	1984	71	1.4	9.68	3.64	8080
TOTAL					356.8				420					1355	2265		720	790		59.2	131			3190	41064			278.4	115.0	81350
AVERAGE					11.5				32	400	400		7.2	62	98	7.4	33	34	7.3	3	6	5.7	1.1	139	1785	69	1.4	8.98	3.71	7905
TYPE OF SAMPLE ANALYZED*													c	c	c	c	c	c	c	c	c	c	G	c	c		c			c
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12	1	12	12		12			18

*C = COMPOSITE; G = GRAB.

APPEARANCE OF ACTIVATED SLUDGE Light Brown IF BULKING, IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None QUANTITY OF DRY S

WEATHER CONDITIONS Ave. 70.3° Hig. 92° Low 43° AVERAGE TEMP. OF

OTHER REMARKS None

S.B.H. 5-0-28 ('48-25M)

OPERATION
PLANT
PE

REPORT FOR East Chicago, Indiana (CITY)

FOR MONTH OF August 1965

SIGNED BY Lorne A. Diehn

	AERATION ED LIQUOR			RETURN SLUDGE		SLUDGE DIGESTION												
	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X 1000	RAW SLUDGE TO DIGESTER—GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN—GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
0	63	1.0	8.77	3.72	8660	.022	39.0	1.6	58	95	7.0	38.0	37.8					
2	67	0.8	8.75	3.71	8220		39.0	4.3	76	96	6.9	30.0	28.6	27.0	1.2			
0	68	0.8	8.71	3.78	7750	.041	36.0	4.4	59	96	6.9	47.5	45.9	36.0	0.2			
0	65	1.8	8.65	3.77	7790		39.0	4.4	73	97	7.0	32.3	31.4	36.0	1.2			
6	63	1.0	8.71	3.77	8380	.120	36.0	2.5	58	95	7.0	37.2	36.7	36.0	0.6			
			8.68	3.75		.081	36.0			96		34.0	32.2	36.0				
			8.65	3.06			36.0			96		29.0	29.6					
4	74	0.8	9.32	3.77	7890	.108	36.0	2.2	55	95	7.0	11.0	11.2					
4	74	1.0	8.72	3.75	8670	.115	36.0	4.5	56	96	7.0	26.5	28.1					
	65	1.0	8.75	3.67	8760	.080	36.0	1.8	56	95	6.9	4.0	4.9					
6	56	1.0	8.75	3.66	8500	.055	36.0	5.0	40	95	7.0			36.0	2.5			
8	69	0.8	8.75	3.67	9460		36.0	2.0	60	95	7.0	16.0	16.7	36.0	2.0			
8	62	1.2	8.47	3.69	7010	.049	39.0			96	7.0	24.5	25.8	39.0				
2	73	1.0	8.95	3.79	6440	.042	36.0			95	7.0	12.0	12.2	42.0				
			8.69	3.70		.042	36.0	3.9	74	95		11.0	10.8	36.0	0.2			
			8.48	3.75		.043	39.0	3.6	78	95		31.0	30.4	39.0	0.6			
0	69	1.0	8.63	3.73	9200	.095	39.0	5.0	67	95	7.0	24.6	24.5					
7	75	1.0	8.66	3.76	7830	.084	39.0	4.4	59	95	7.0	26.5	25.6					
7	56	1.6	8.70	3.78	7160	.085	39.0	5.4	52	95	7.0	26.0	25.6	39.0	0.6			
			8.75	3.79		.082	39.0			95		30.0	31.5	39.0				
			8.71	3.83		.032	36.0			95		24.2	25.0	36.0				
0	70	2.6	9.36	3.92	8220	.048	39.0	5.0	58	96	6.9	18.5	18.0	30.0	0.8			
2	53	1.2	9.65	3.64	5620	.021	39.0	3.2	56	95	7.0	17.0	17.3	39.0	0.8			
6	68	1.2	9.01	3.70	7110	.040	36.0	3.2	54	97	7.0	23.0	22.9	36.0	1.2			
2	74	1.2	9.64	3.75	8320	.027	39.0	4.6	59	96	7.0	25.0	24.4		2.5			
2	77	1.2	10.48	3.74	8870	.058	36.0	2.9	60	97	6.9	19.0	19.2	36.0	3.2			
			9.47	3.83		.118	45.0			95		11.0	11.1	45.0				
			8.70	3.66		.052	36.0			95		6.4	6.4	36.0				
5	77	3.0	9.69	3.73	7040	.091	36.0	2.7	62	92	6.9	4.0	4.1	36.0	2.6			
0	76	4.6	9.50	3.65	6900	.110	39.0	4.5	55	92	6.9	10.0	9.2	39.0	1.4			
4	71	1.4	9.68	3.64	8080	.035	39.0	5.4	46	95	6.9	24.0	24.8	39.0	0.4			
4			27.4	115.0	21990	1.64	1,167.0	88.5	1463			673.0	671.9	849.0				
5	69	1.4	8.98	3.71	7908	.053	37.6	3.8	61	95	7.0	21.7	21.7	36.9	1.3			
		C			C			C	C		C	C	C	C	C			
		12			18			12	12		1	1	1	1	1			

IF BULKING, IN WHAT PERIOD None

QUANTITY OF DRY SLUDGE REMOVED None

AVERAGE TEMP. OF RAW SEWAGE 71°

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	47	65
SECONDARY TREATMENT	48	29
OVERALL TREATMENT	95	94

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.69	1.54	2.02
AERATION TANK	3.89	2.63	3.25
FINAL SETTLING TANK	3.81	2.27	2.97

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			763
FINAL SETTLING TANK			488

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			15,252
FINAL SETTLING TANK			12,208

EQUIV. POP. TREATED = 34,979
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.780
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1,587
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	45.1

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO.	$ 5,297.40
ELECTRICITY PURCHASED ____ K.W.H.	$ 1,208.07
GAS PURCHASED ____ C.F.	$ 182.45
CHEMICALS & SUPPLIES	$
MAINTENANCE Fuel Oil	$ 395.20
OTHER OPERATING COSTS	$
AMORTIZATION COSTS	$
PAYMENTS TO DEPRECIATION FUND	$
TOTAL	$ 7,083.12
COST/M.G. SEW. TREAT.	$ 19.84
COST/CAPITA/MO.	$ 0.124
COST/1000 LB. B.O.D. REMOVED	$ 40.48
REVENUE RECEIVED	$

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

ACTIVATED SLUDGE TYPE

DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	CHEMICALS USED: ALUM LBS/DAY	CHEMICALS USED: CHLORINE LBS/DAY	CHEMICALS USED: LBS/DAY	RAW SEWAGE: pH	RAW SEWAGE: 5-DAY B.O.D.—P.P.M.	RAW SEWAGE: SUSP. SOLIDS—P.P.M.	PRIMARY EFFLUENT: pH	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M.	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: pH	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M.	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M.	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M.	FINAL EFFLUENT: RESIDUAL CHLORINE—P.P.M.	AERATION: MIXED LIQUOR: SETTLEABLE SOLIDS % IN 30 MINUTES	AERATION: MIXED LIQUOR: ~~TOTAL SOLIDS~~ ~~P.P.M.~~ SUSP. Solids	AERATION: MIXED LIQUOR: SLUDGE INDEX	AERATION: MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M.	AERATION: MIXED LIQUOR: AIR USED IN AERATION MILLION CU. FT.	AERATION: RETURN SLUDGE: VOLUME—M.G.D.	AERATION: RETURN SLUDGE: ~~TOTAL SOLIDS~~ ~~P.P.M.~~ SUSP. Solids	WASTE ACT. SLUDGE TO DIGESTER—GAL. X 1000
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	W				13.7					400	400		7.3	39	67	7.4	29	44	7.3	0.1	8	5.8	1.3	140	2032	69	1.8	9.62	3.76	8880	.032
2	Th				11.6				14				7.2	59	98	7.3	17	85	7.3	7.0	5	5.6	1.0	140	2352	60	1.4	9.78	3.73	9510	.018
3	F				12.2				14														1.0					9.41	3.65		.105
4	S				12.1																							9.58	3.68		.041
5	Su				10.6																							9.52	3.69		.028
6	M				10.4								7.1	75	77	7.5	45	35	7.3	0.2	6	6.4		140	1960	71	1.4	9.69	3.72	7640	.045
7	T				12.5				14														1.9					8.98	3.79		—
8	W				13.3								7.3	40	33	7.6	39	23	7.3	0	7	5.8	1.5	140	2012	70	3.4	9.14	3.71	6530	.054
9	Th				13.0				27				7.1	34	104	7.4	36	74	7.3	2.0	9	5.4	1.8	140	1708	82	2.2	8.45	3.69	7320	.018
10	F				12.0																		1.6					8.45	3.75		.038
11	S				11.4																							8.80	3.73		.066
12	Su				10.2								7.2	39	83	7.5	23	30	7.3	0	3	5.8		150	1808	83	1.4	8.88	3.77	7030	.072
13	M				11.9				54				7.2	53	65	7.4	46	37	7.4	0.4	5	6.4	1.4	160	1644	97	1.4	9.41	3.79	8710	—
14	T				12.9								7.1	50	115	7.3	40	49	7.3	0	2	5.4	2.0	160	1572	102	2.6	7.71	3.77	6720	.004
15	W				13.2				54				7.1	31	75	7.4	30	56	7.3	0	7	5.4	1.8	150	1672	90	1.4	8.71	3.76	6920	.072
16	Th				13.3								7.1	38	91	7.3	30	57	7.4	0.4	8	5.8	1.8	160	1892	86	1.4	8.6	3.76	14420	.058
17	F				13.0				27														1.6					8.15	3.61		.102
18	S				12.4																							8.5	3.66		.044
19	Su				14.9								7.2	74	44	7.3	48	27	7.3	0.2	4	5.6		140	1776	79	2.0	8.2	3.78	7870	—
20	M				12.9				27				7.1	102	286	7.4	46	54	7.3	7.0	4	4.8	1.5	135	1444	93	3.2	8.5	3.72	7330	—
21	T				14.8				14														1.3					8.66	3.66		.037
22	W				14.6								7.2	52	115	7.2	35	53	7.2	1.0	4	4.1		130	1368	95	2.8	8.99	3.75	6360	.048
23	Th				13.7				27														1.1					8.81	3.74		.052
24	F				13.5																		2.0					8.79	3.73		.043
25	S				12.0				14																			8.83	3.77		—
26	Su				14.6								7.1	41	50	7.3	28	30	7.4	3.0	2	5.6		140	1804	78	1.0	8.87	3.79	8300	—
27	M				13.0				27				7.5	64	83	7.6	44	45	7.4	2.0	6	5.8	0.7	140	1684	83	1.2	8.89	3.70	7230	.049
28	T				13.4				14				7.2	107	99	7.5	44	39	7.3	3.0	10	6.0	1.4	130	1540	84	2.6	8.75	3.65	7420	.048
29	W				12.2								7.3	77	65	7.7	53	30	7.6	4.0	15	6.4	1.0	130	1572	83	1.8	8.74	3.85	6390	—
30	Th				14.9								7.2	214	56	7.5	83	50	7.4	2.0	16	5.8	1.2	140	1528	92	1.8	8.74	3.82	8100	—
31																															
TOTAL					35902				327					1194	1596		716	768		44.3	121			2565	31368			266.45	1120	141260	1.129
AVERAGE					12.8					400	400		7.2	66	89	7.4	40	43	7.3	2.4	7	5.7	1.4	142	1743	83	1.7	8.88	3.73	7848	.051
TYPE OF SAMPLE ANALYZED*													c	c	c	c	c	c	c	c	c	c	G	c	c		c			c	
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12	1	12	12		12			12	

*C=COMPOSITE; G=GRAB.

APPEARANCE OF ACTIVATED SLUDGE LIGHT BROWN IF BULKING, IN WHAT PERIO

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN NONE QUANTITY OF DRY SLUDGE

WEATHER CONDITIONS AVERAGE TEMP. OF RAW SE

OTHER REMARKS NONE

OPERATION
PLANT
TYPE

REPORT FOR EAST CHICAGO INDIANA (CITY)

FOR MONTH OF SEPTEMBER 1965

SIGNED BY Lowell A. Lesher

AERATION MIXED LIQUOR				RETURN SLUDGE		SLUDGE DIGESTION												
~~[illegible]~~ P.P.M. SUSP. SOLIDS	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	~~[illegible]~~ P.P.M. SUSP. SOLIDS	WASTE ACT. SLUDGE TO DIGESTER GAL. X 1000	RAW SLUDGE TO DIGESTER GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F.	pH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
1032	69	1.8	9.62	3.76	8880	.032	39.0	4.9	57	94	6.9	22.5	22.0	39.0	1.6			
1852	60	1.4	9.78	3.73	9510	.018	36.0	4.7	61	94	6.9	21.4	21.3	36.0	1.8			
			9.41	3.65		.105	39.0			93		22.0	20.7	36.0				
			9.58	3.68		.041				95		24.5	24.2	42.0				
			9.52	3.69		.022				95		15.7	14.8	36.0				
1960	71	1.4	9.69	3.72	7640	.045	36.0	5.4	57	95	7.0	11.4	11.0	39.0				
			8.98	3.79		—	39.0			95		31.6	31.1	36.0				
2012	70	3.4	9.14	3.71	6830	.064	36.0	4.9	45	95	7.1	22.0	21.9	—				
1708	82	2.2	8.45	3.69	7320	.018	39.0	4.5	60	96	7.0	16.2	15.0	33.0				
			8.45	3.75		.038	36.0			95		11.1	10.0	36.0				
			8.80	3.73		.066	39.0			94		22.6	22.3	33.0				
1908	83	1.4	8.88	3.77	7030	.072	36.0	5.0	60	96	7.2	33.5	33.0	36.0				
1644	97	1.4	9.41	3.79	8710	—	39.0	4.7	70	96	7.1	22.7	22.6	36.0	1.0			
1572	102	2.6	7.71	3.77	4720	.004	30.0	4.5	61	94	7.1	2.6	2.5	57.0				
1772	90	1.4	8.78	3.76	6920	.072	33.0			96	7.1	17.0	16.9	33.0				
1992	86	1.4	8.66	3.76	14420	.058	36.0	5.3	37	96	7.1	18.2	18.0	36.0	2.5			
			8.12	3.61		.102	36.0			94		10.2	9.0	36.0				
			8.50	3.66		.044	36.0			92		—		39.0				
1776	79	2.0	8.20	3.78	7270	—	36.0	5.1	50	95	7.0	0.4	0.3	36.0	4.6			
1444	93	3.2	8.50	3.72	7330	—	36.0	4.8	61	90	7.1	2.0	1.9	36.0	1.8			
			8.66	3.66		.037	39.0			90		3.9	3.8	39.0				
1968	95	2.8	8.99	3.75	6360	.048	36.0	5.2	61	93	7.0	—	—	36.0				
			8.81	3.74		.083	39.0			93		—	—	39.0				
			8.79	3.73		.043	36.0			94		—	—	39.0				
			8.83	3.77		—	36.0			95		—	—	—				
1804	78	1.0	8.87	3.79	8300	—	36.0	4.2	65	95	7.0	—	—	39.0				
1484	83	1.2	8.89	3.70	7220	.049	39.0	5.8	62	95	7.0	—	—	39.0				
1540	84	2.6	8.75	3.65	7420	.048	39.0	4.1	71	95		—	—	39.0	0.8			
1672	83	1.8	8.74	3.85	6390	—	36.0	4.1	55	97	7.2	1.5	—	36.0	0.8			
1528	92	1.8	8.74	3.82	8100	—	36.0	4.3	43	94	7.2	2.7	—	36.0				
1368			266.45	11201	14260	1.129	1029.0					3823		105.30				
1743	83	1.7	8.88	3.73	7848	.051	37.0	4.6	57	95	7.0	18.2	17	38.0	1.9			
C		C			C			C	C		C	C	C	C	C			
12		12			12			12	12		1	1	1	1	1			

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 70°

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	52	59
SECONDARY TREATMENT	40	57
OVERALL TREATMENT	92	96

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.22	1.55	1.88
AERATION TANK	3.47	2.58	3.02
FINAL SETTLING TANK	3.27	2.27	2.77

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			849
FINAL SETTLING TANK			543

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			16,972
FINAL SETTLING TANK			13,585

EQUIV. POP. TREATED = 41,444
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.694
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1,981
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	38.0

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO. $ 5188.80

ELECTRICITY PURCHASED ____ K.W.H. $ 2490.08

GAS PURCHASED ____ C.F. $ 192.31

CHEMICALS & SUPPLIES $ ____

MAINTENANCE Fuel 0.1 $ 395.20

OTHER OPERATING COSTS $ ____

AMORTIZATION COSTS $ ____

PAYMENTS TO DEPRECIATION FUND $ ____

TOTAL $ 8,260.39

COST/M.G. SEW. TREAT. $ 21.51

COST/CAPITA/MO. $ 0.145

COST/1000 LB. B.O.D. REMOVED $ 61.19

REVENUE RECEIVED $ ____

SEWAGE TREATMENT PLANT **MONTHLY REPO**

GUGGENHEIM BIOC

DR. JOHN B. NICOSIA, Mayor **EAST CHIC**

DAY OF MONTH	DAY OF WEEK	RAW SEWAGE BY-PASSED M.G.D.	PRIMARY TREAT. ONLY M.G.D.	COMPLETE TREAT. M.G.D.	STREAM FLOW M.G.D.	5 DAY B.O.D. MG./L. UPSTREAM OF S.T.P.	5 DAY B.O.D. MG./L. DOWNSTREAM S.T.P.	GRIT REMOVED CU. FT.	SCREENINGS REMOVED CU. FT.	SCUM REMOVED CU. FT.	CHEMICALS USED: CHLORINE LBS./DAY	CHEMICALS USED: ALUM LBS./DAY	CHEMICALS USED: LBS./DAY	CHEMICALS USED: LBS./DAY
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	F			13.1				27			400	400		
2	S			11.4							400	400		
3	Su			9.9							400	400		
4	M			10.5				27			400	400		
5	T			11.0							400	400		
6	W			10.7				27			400	400		
7	Th			11.4							400	400		
8	F			10.1				27			400	400		
9	S			10.0							400	400		
10	Su			8.5							400	400		
11	M			14.9				27			400	400		
12	T			12.8							400	400		
13	W			9.3				27			400	400		
14	Th			14.9							400	400		
15	F			10.8				27			400	400		
16	S			12.2							400	400		
17	Su			11.2							400	400		
18	M			11.9				27			400	400		
19	T			11.8							400	400		
20	W			11.1				27			400	400		
21	Th			14.6							400	400		
22	F			12.4				27			400	400		
23	S			12.8							400	400		
24	Su			11.7							400	400		
25	M			12.1				27			400	400		
26	T			12.1							400	400		
27	W			11.1				27			400	400		
28	Th			12.2							400	400		
29	F			12.4				14			400	400		
30	S			12.4							400	400		
31	Su			10.1							400	400		
TOTAL				366				358						
AVERAGE				11.7				26			400	400		
TYPE OF SAMPLE ANALYZED*														
NO. OF PORTIONS COLLECTED DAILY														

DAY OF MONTH	RAW SEWAGE: PH	5 DAY B.O.D. MG./L.	SUSP. SOLIDS MG./L.	TEMP F	ALKALINITY MG./L.	D. O. MG./L.	C. O. D. MG./L.	VOLATILE SOLIDS MG./L.	TOTAL AMMONIA NH3 MG./L.	CYANIDE CN- MG./L.	OIL MG./L.	PHENOLS MG./L.	CHROMATE MG./L.	IRON MG./L.	PHOSPHATE MG./L.	NITRATES MG./L.	NITRITES MG./L.	CONDUCTIVITY
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1				66	218		118			.06		1.5			9.2			
2				64	218		151			.06		2.9						
3	7.1	119	135	68	214	4.0	135	66	235	.04		2.2						
4	7.1	155	119	66	209	2.2	196	84	8.26	.14		1.2			5.2			
5	7.1	121	83	68	234	2.4	187	95	12.11	.08		2.7						
6	7.1	104	91	68	220	3.8	221	63	7.63	.04		5.2						
7	7.1	80	186	68	206	4.6	256	80	7.56	.08		4.0						
8				68	238				6.02	.06		5.4						
9				69	230		312		5.53	.08		4.8						
10	7.3	155	107	68	202	2.0	91	86	7.98	.12		5.1						
11	7.2	111	75	68	210	2.0	164	61		.24		4.5						
12	7.2	85	187	66	224	3.6	209	91		.24		8.2						
13	7.1	83	55	65	218	3.6	261	82		.12		5.2			8.0			
14	7.1	69	85	71	212	3.4	119	73		.04		0.01						
15				70	212					.02		.03						
16				71	216		187			.02		.004						
17	7.1	66	171	70	234	3.2	209	88	8.40	.00								
18	7.4	65	69	68	218	2.4	156	87	6.58			.000			7.2			
19	7.5	61	123	66	186	2.2	99	70	5.54			.002						
20	7.1	48	143	66	160	2.4	181	56	6.09			.007						
21	7.1	69	158	66	176	3.2	160	68	4.69			.010						
22				66	182													
23				64	368													
24	7.1	25	60	64	220	4.8	170	100	6.10	.001		.015						
25	7.1	44	69	62	212	2.6	268	46	7.70	.122		.140			6.8			
26	7.1	62	134	64	210	2.8	148	69	7.90	.090		.150			5.6			
27	7.1	71	77	66	214	4.6	181	91	7.21			.147						
28	7.1	85	168	64	220	4.6	142	62	17.50			.230						
29				63	182		85					.035						
30				64	133		232		7.70			.252						
31	7.1	54	62	66	198	3.2	135	97	7.14			.204						
TOTAL	150.1	1711			6641		4777		157.9	1.66		4.02			41.0			
AVERAGE	7.1	81	112	67	214	3.2	177	77	7.90	.08		1.7			6.8			
TYPE OF SAMPLE ANALYZED*	c	c	c		c	c	c		c	c		c			c			
NO. OF PORTIONS COLLECTED DAILY	12	12	12		12	12	12		12	12		12			12			

DAY OF MONTH	PRIMARY EFFLUENT: PH	5 DAY B.O.D. MG./L.	SUSP. SOLIDS MG./L.
1	34	35	36
1			
2			
3	7.5	34	20
4	7.4	73	25
5	7.3	73	36
6	7.4	92	47
7	7.3	64	45
8			
9			
10	7.6	113	35
11	7.7	64	44
12	7.8	59	25
13	7.5	59	31
14	7.6	57	36
15			
16			
17	7.7	45	25
18	7.5	47	36
19	7.5	52	118
20	7.4	41	36
21	7.6	44	38
22			
23			
24	7.5	25	27
25	7.5	35	29
26	7.4	58	46
27	7.4	37	32
28	7.5	42	42
29			
30			
31	7.5	44	60
TOTAL		1173	833
AVERAGE	7.5	56	40
TYPE OF SAMPLE ANALYZED*	c	c	c
NO. OF PORTIONS COLLECTED DAILY	12	12	12

*C—COMPOSITE G—GRAB.

APPEARANCE OF ACTIVATED SLUDGE _____ IF BULKING, IN WHAT PERIO

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN NONE QUANTITY OF DRY SLUDGE

WEATHER CONDITIONS AVE. 54.0° HIGH 84° LOW 30° AVERAGE TEMP. OF RAW S

OTHER REMARKS _____

NTHLY REPORT OF OPERATION

Date OCTOBE

HEIM BIOCHEMICAL TREATMENT

EAST CHICAGO, INDIANA

CORNEL A. LEAHU, Superinte

		PRIMARY EFFLUENT			FINAL EFFLUENT																	AERATION: MIXED LIQUOR					AERATION: RETURN SLUDGE		SLUDGE DIGE						
NITRITES MG./L.	GYROSITY	PH	5 DAY B.O.D. MG./L.	SUSP. SOLIDS MG./L.	PH	5 DAY B.O.D. MG./L.	SUSP. SOLIDS MG./L.	TEMP F	ALKALINITY MG./L.	D. O. MG./L.	C. O. D. MG./L.	TOTAL AMMONIA NH3 MG./L.	CYANIDE CN- MG./L.	OIL MG./L.	PHENOLS MG./L.	CHROMATE MG./L.	IRON MG./L.	PHOSPHATE MG./L.	NITRATE MG./L.	NITRITE MG./L.	RESIDUAL CHLORINE MG./L.	SETTLEABLE SOLIDS IN 30 MINUTES	SUSP. SOLIDS MG./L.	SLUDGE INDEX	DISSOLVED OXYGEN MG./L.	AIR USED IN AERATION MILLION CU. FT.	VOLUME M.G.D.	SUSP. SOLIDS MG./L.	WASTE ACT. SLUDGE TO DIGESTER - GALS 1000	RAW SLUDGE TO DIGESTER - GALS 1000	TOTAL SOLIDS IN RAW SLUDGE - %	TOTAL VOL. SOLIDS IN RAW SLUDGE - %	TEMP. IN DIGESTER F	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
									198		2		.04		.004			6.0			0.4					8.78	3.81		39	39			93		9.0
									266		78		.04		.006											8.95	3.70			36			95		2.0
		7.5	84	20	7.4	10	5		210	4.0	38		.02		.000							140	1724	81	1.2	8.85	3.81	6870		39	4.5	67	93		1.1
		7.4	73	25	7.4	16	7		222	5.4	27	8.54	.06		.008			7.4			0.1	130	1264	103	1.2	8.83	3.71	5510	140	39	3.5	67	80		5.0
		7.3	78	36	7.4	14	7		224	5.6	57	10.64	.06		.002						0.1	140	2008	70	1.8	8.96	3.80	5170	101	36	2.4	67	89		13.9
		7.4	92	47	7.4	14	37		238	4.2	65	8.82	.02		.008						0.2	150	1440	104	1.4	8.70	3.72	5710	42	39	3.3	71	94		20.3
		7.3	64	45	7.4	16	13		240	4.6	72	12.44	.04		.020						0.2	140	2020	69	1.8	8.42	3.79	9670	114	36	4.2	65	97		17.8
									206			8.68	.04		.006						0.2					8.96	3.68		84	39			95		13.0
									208		70	8.96	.06		.003											8.80	3.66		66	36			95		9.2
		7.6	113	35	7.5	8	8		228	5.6	50	8.12	.12		.003							140	1388	100	1.2	8.60	3.65	4740	95	36	3.6	83	96		9.0
		7.7	64	44	7.5	12	8		220	5.4	19	8.19	.14		.009						0.2	140	1264	110	1.8	8.81	3.70	4520	11	39	3.6	56	96		7.2
		7.8	59	25	7.5	13	4		220	5.6	64		.20		.024						0.1	140	1064	131	1.4	8.95	3.68	4120	104	36	3.5	61	95	6.3	6.0
		7.5	59	81	7.5	10	4		228	5.2	54		.08		.028			4.8			0.2	150	1216	123	1.0	8.96	3.65	1770	120		1.3	67	95	6.2	12.8
		.6	57	36	7.6	7	2		236	5.4	40		.02		.006						0.2	150	1584	94	1.6	8.69	3.79	8380	160		4.8	65	95	6.2	9.4
									208				.02		.001						0.2					8.79	3.73		102				95		9.5
									206		45		.00		.000											8.84	3.72		51				96		3.0
		7.7	45	25	7.6	0	4		280	6.8	35	5.18	.00									130	1148	113	4.6	8.74	3.77	4460	68		2.7	85	95	6.2	15.8
		7.5	47	86	7.6	1	3		230	6.0	27	7.49			.000			7.2			1.0	155	1280	121	3.8	9.63	3.81	4350	160		2.9	80	96	6.3	12.0
		7.5	52	118	7.6	0	1		200	6.4	26	8.26			.004						1.0	145	1248	116	3.6	8.67	3.62	4600	57		4.0	70	94	6.3	7.3
		7.4	41	36	7.4	1	3		168	6.1	29	5.46			.000						0.8	130	880	148	4.4	8.62	3.63	3900	104		3.5	76	97	6.2	10.0
		7.6	44	38	7.6	0.5	5		160	6.0	20	7.21			.002						0.7	155	976	159	4.6	9.63	3.73	5320	120		4.2	67	96	6.2	
									154												1.0					9.82	3.64						93		16.0
									196																	9.82	3.63						93		15.0
		7.5	25	27	7.5	0.1	9		202	6.8	38	5.60	.00		.001							130	1272	102	4.2	9.91	3.60	6430	56		3.9	68	96	6.1	10.0
		7.5	35	28	7.4	3	4		202	6.2	63	7.30	.09		.000			4.8			0.4	135	1468	92	2.8	9.35	3.60	5890	32		2.6	92	96	6.1	12.0
		7.4	58	46	7.4	16	35		220	6.0	59	7.80	.11		.001			5.6			0.1	130	1512	86	2.8	8.43	3.55	5520	53		3.6	67	96	6.1	12.7
		7.4	37	32	7.4	12	5		220	6.4	44	8.61			.002						0.1	130	1312	99	4.4	8.44	3.88	5790			4.8	75	96	6.2	22.7
		7.5	42	42	7.5	5	10		198	6.6	38	9.45			.003						0.1	135	1116	121	4.6	9.32	3.99	6790			2.3	82	95	6.1	14.2
									192		24				.000						0.1					9.35	4.06						96		3.0
									188		36	6.30			.004											9.65	4.22		120				96		8.0
		7.5	44	60	7.4	2	6		194	6.0	41	7.35			.002							140	1518	92	3.4	9.40	4.06	6000	124		2.3	82	95	6.1	9.0
			1173	833	4496	146.6	173		6472	101.5	1161	160.9	1.16		.145			24.0					28714			27.7	116.34	115810	2183						5209
		7.5	56	40	7.1	7.6	8		209	4.8	43	8.02	.08		.007			4.0			0.3	140	1367	106	2.8	9.02	3.75	5515	88		5.4	72	95	6.2	10.7
		C	C	C	C	C	C		C	C	C	C	C		C			C			G	C	C		C			C			G	G		G	
		12	12	12	12	12	12		12	12	12	12	12		12			12			2	12	12		12			12			1	1	1	1	

LKING, IN WHAT PERIOD NONE

TITY OF DRY SLUDGE REMOVED NONE

AGE TEMP. OF RAW SEWAGE 67

Date OCTOBER, 1965

CORNEL A. LEAHU, Superintendent

			AERATION							SLUDGE DIGESTION													
			MIXED LIQUOR					RETURN SLUDGE															
NITRATE MG./L.	NITRITE MG./L.	RESIDUAL CHLORINE MG./L.	SETTLEABLE SOLIDS IN 30 MINUTES	SUSP. SOLIDS MG./L.	SLUDGE INDEX	DISSOLVED OXYGEN MG./L.	AIR USED IN AERATION MILLION CU. FT.	VOLUME M.G.D.	SUSP. SOLIDS MG./L.	WASTE ACT. SLUDGE TO DIGESTER - GALX 1000	RAW SLUDGE TO DIGESTER - GALX 1000	TOTAL SOLIDS IN RAW SLUDGE - %	TOTAL VOL. SOLIDS IN RAW SLUDGE - %	TEMP. IN DIGESTER F	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN GAL. X 1000	SOLIDS IN SUPERNATANT %	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE %	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE %
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
		0.4					8.78	3.81		39	39			93		9.0	9.0	12.0				
							8.95	3.70			36			95		2.0		36.0				
			140	1724	81	1.2	8.65	3.81	6870		39	4.5	57	93		1.1						
		0.1	130	1264	103	1.2	8.83	3.71	5510	140	39	3.5	67	80		5.0		240				
		0.1	140	2008	70	1.8	8.96	3.80	5170	101	36	2.4	67	89		13.9	12.9					
		0.2	150	1440	104	1.4	8.70	3.72	5710	42	39	3.3	71	94		20.3	20.2			36.0	~~3.8~~	
		0.2	140	2020	69	1.8	8.42	3.79	9670	114	36	4.2	65	97		17.8	17.6			39.0	~~2.4~~	
		0.2					8.96	3.48		84	39			95		13.0	12.9			36.0		
							8.80	3.66		66	36			95		9.2	8.8			39.0		
			140	1388	100	1.2	5.60	3.65	4740	95	36	3.6	83	96		9.0	8.5			36.0		
		0.2	140	1264	110	1.8	8.81	3.70	4520	11	39	3.6	56	96		7.2	7.0			36.0		
		0.1	140	1064	131	1.4	8.95	3.68	4120	104	36	3.5	61	95	6.3	6.0	5.9		3.5	36.0	3.5	61
		0.2	150	1216	123	1.0	8.96	3.65	1770	120		1.3	67	95	6.2	12.8	12.5			36.0	3.0	60
		0.2	150	1592	94	1.6	8.69	3.79	8380	160		4.8	65	95	6.2	9.4	9.2		4.1		2.8	50
		0.2					8.79	3.73		102				95		9.5	9.4			36.0		
							8.84	3.72		51				96		3.0	2.5					
			130	1148	113	4.6	8.74	3.77	4460	68		2.7	85	95	6.2	15.8	15.6			36.0	3.0	71
		1.0	155	1280	121	3.8	9.63	3.81	4350	160		2.9	80	96	6.3	12.0	12.2		2.7		1.8	78
		1.0	145	1248	116	3.6	8.67	3.68	4600	57		4.0	70	94	6.3	7.3	7.2				2.4	67
		0.8	130	880	148	4.4	8.62	3.63	3900	104		3.5	76	97	6.2	10.0	10.0				4.8	71
		0.7	155	976	159	4.6	9.63	3.73	5320	120		4.2	67	96	6.2						3.0	71
		1.0					9.82	3.64						93		16.0	15.5					
							9.82	3.63						93		15.0	17.0			36.0		
			130	1272	102	4.2	9.91	3.60	6430	56		3.9	68	96	6.1	10.0	10.3			36.0	3.7	58
		0.4	135	1468	92	4.8	9.36	3.60	5890	82		2.6	92	96	6.1	12.0	12.3		0.4		3.4	81
		0.1	130	1572	86	4.8	8.43	3.55	5820	53		3.6	67	96	6.1	17.7	25.3		3.0	39.0	2.6	69
		0.1	130	1312	99	4.4	8.44	3.83	5790			4.8	75	96	6.2	22.7	16.3		1.8	36.0	2.4	58
		0.1	135	1116	121	4.6	9.32	3.99	6790			2.3	82	95	6.1	14.2	36.5		3.4		2.8	69
		0.1					9.35	4.06						96		3.0	17.7	39.0		39.0		
							9.65	4.22		120				96		8.0	15.0	36.0				
			140	1518	92	3.4	9.40	4.6	6000	124		2.3	82	95	6.1	9.0	17.5	39.0	0.6		2.2	73
				28714			27.7	16.31	115810	2123						320.9	358.8			552.0	41.4	
		0.3	140	1367	106	2.8	9.02	9.75	5515	88		3.4	72	95	6.2	10.7	13.3	31.0	2.4	36.8	3.0	67
		G	C	C		C			C			G	G		G			G	G	G	G	G
		2	12	12		12			12			1	1	1	1			1	1	1	1	1

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	31	64
SECONDARY TREATMENT	59	29
OVERALL TREATMENT	90	93

DETENTION TIME HRS.	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.67	1.59	1.99
AERATION TANK	4.04	2.63	3.21
FINAL SETTLING TANK	3.93	2.23	2.94

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			776
FINAL SETTLING TANK			497

WIER OVERFLOW RATE GAL./FT. OF WIER/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			15,517
FINAL SETTLING TANK			12,420

EQUIV. POP. TREATED 46,494
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.774
C. F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1,267
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	33.9

TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C. F. GAS PROD/DAY/LB. V. S. ADDED	

MAN DAYS AT PLANT _____ PAYROLL/MO. $ 4,649.34
ELECTRICITY PURCHASED _____ K.W.H. $ 1,087.10
GAS PURCHASED _____ C. F. $ 186.90
CHEMICALS & SUPPLIES FUEL OIL $ 395.20
MAINTENANCE $ _____
OTHER COSTS $ _____
TOTAL $ 6,328.54
COST/M.G. SEW. TREAT. $ $17.50
COST/CAPITA/MO. $ $0.111
COST/1000 LB. B.O.D. REMOVED $ $28.64
REVENUE RECEIVED $ _____

SEWAGE TREATMENT PLANT

MONTHLY REPO

GUGGENHEIM BIOC

DR. JOHN B. NICOSIA, Mayor

EAST CHIC

DAY OF MONTH	DAY OF WEEK	RAW SEWAGE BY-PASSED M.G.D.	PRIMARY TREAT. ONLY M.G.D.	COMPLETE TREAT. M.G.D.	STREAM FLOW M.G.D.	5 DAY B.O.D. MG./L. UPSTREAM OF S.T.P.	5 DAY B.O.D. MG./L. DOWNSTREAM S.T.P.	GRIT REMOVED CU. FT.	SCREENINGS REMOVED CU. FT.	SCUM REMOVED CU. FT.	CHEMICALS USED: ALUM LBS./DAY	CHLORINE TO FINAL LBS./DAY	CHLORINE TO RAW LBS./DAY	LBS./DAY	RAW SEWAGE: PH	5 DAY B.O.D. MG./L.	SUSP. SOLIDS MG./L.	TEMP F	ALKALINITY MG./L.	D. O. MG./L.	C. O. D. MG./L.	VOLATILE SOLIDS %	TOTAL AMMONIA NH3 MG./L.	CYANIDE CN- MG./L.	OIL MG./L.	PHENOLS MG./L.	CHROMATE MG./L.	IRON MG./L.	PHOSPHATE MG./L.	NITRATES MG./L.	NITRITES MG./L.	CONDUCTIVITY	PRIMARY EFFLUENT: PH	5 DAY B.O.D. MG./L.	SUSP. SOLIDS MG./L.	[illegible]
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	M			10.0				27	24		400	400	125		7.5	75	186	65	202	5.6	497	61	8.19	.164		1.72							7.4	83	72	7[illegible]
2	T			11.2							400	400	125		7.5	110	130	64	196	2.4	241	67	7.90	.025		.55							7.4	90	52	7[illegible]
3	W			11.6							400	400	125		7.4	164	83	66	194	2.6	215	72	9.30	.200		1.00			4.0				7.4	99	76	7[illegible]
4	Th			11.6				27	15		400	400	125		7.4	134	90	64	224	3.2	114	67	9.10	.170		1.25							7.5	115	39	7[illegible]
5	F			10.7							400	400	125					64	222		109		8.82	.160		.82										
6	S			10.6				27	24		400	400	125					66	226		235		10.92	.180		.62										
7	Su			9.7							400	400	75		7.5	162	90	66	196	1.8	184	56	11.27	.240		1.92							7.6	122	37	7[illegible]
8	M			11.1				27	21		400	400	125		7.4	136	83	66	198	2.6	159	76	7.35	.000		.068			4.8				7.5	103	40	7[illegible]
9	T			10.7							400	400	125		7.3	51	83	64	204	1.8	137	67	8.26	.020		.50							7.5	31	48	7[illegible]
10	W			10.7							400	400	125					62	220		155		9.52	.240		2.5										
11	Th			10.7				27	24		400	400	125		7.3	39	72	64	174	2.6	199	63	10.78	.320		1.32							7.3	52	56	7[illegible]
12	F			11.4							400	400	125					66	216		118		7.00			1.02			5.4							
13	S			10.6				27	18		400	400	125					64	210		192		7.35			1.00										
14	Su			10.6							400	400	125		7.1	164	61	64	260	3.6	144	64	8.26	.110		1.50							7.6	122	36	7[illegible]
15	M			11.8				27	18		400	400	125		7.2	50	99	64	240	2.4	188	62	16.80			4.00							7.7	56	36	7[illegible]
16	T			11.1							400	400	125		7.3	79	69	66	216	1.2	180	58	13.30	.230		6.48			4.8				7.3	77	33	7[illegible]
17	W			11.0							400	400	200		7.6	40	110	62	214	2.6	179	52	10.80	.200		5.20							7.6	67	59	7[illegible]
18	Th			11.2				27	18		400	400	250		7.4	62	130	62	220	2.4	372	64	13.02	.000		7.40							7.6	69	66	7[illegible]
19	F			10.4					24		400	400	175					60	212		186		14.70			10.60										
20	S			10.7				27	18		400	400	250					62	190		183		15.40			10.00										
21	Su			9.8					21		400	400	250		8.1	40	134	63	240	4.2	183	46	16.10			7.60							8.0	40	61	7[illegible]
22	M			10.4				27	12		400	400	250		7.8	69	92	63	200	2.6	147	82	10.36	.080		3.20							7.8	55	36	7[illegible]
23	T			10.2							400	400	250		8.3	50	160	61	220	3.2	220	48	22.40	.220		10.00			0.4				8.2	72	62	7[illegible]
24	W			10.6							400	400	100					60	220		103		22.54	.160		12.00										
25	Th			10.5				27	24		500	400	250		7.9	82	108	62	190	4.0	176	61	12.88	.200		9.60							8.1	75	105	7[illegible]
26	F			12.6							500	400	250					60	182		155		23.80	.260		7.00										
27	S			11.8				27	21		400	400	250					58	196		110		8.54	.200		3.60										
28	Su			10.6							500	400	250		8.0	28	70	56	220	4.2	117	56	11.20	.280		6.00							8.1	35	61	7[illegible]
29	M			11.4				14	15		400	400	250		7.9	54	73	56	208	2.0	171	63	11.48	.280		8.00							7.9	53	55	7[illegible]
30	T			10.2							400	400	250		7.9	34	79	56	206	1.4	124	57	7.35	.400		7.40			2.0				7.8	46	58	7[illegible]
31																																				
TOTAL				3256				338	297		15000	19000	5175			1623	2002		6316		5488		354.19	4.329		128.12			21.4					1462	1088	
AVERAGE				10.9				26	20		500	400	173		7.6	81	100	63	211	2.7	183	62	11.82	.197		4.27			3.6				7.7	73	54	7[illegible]
TYPE OF SAMPLE ANALYZED*															C	C	C		C	C	C		C	C		C			C					C	C	C	[illegible]
NO. OF PORTIONS COLLECTED DAILY															12	12	12		12	12	12		12	12		12								12	12	12	[illegible]

*C—COMPOSITE G—GRAB.

APPEARANCE OF ACTIVATED SLUDGE _____ IF BULKING, IN WHAT PERIOD

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN NONE _____ QUANTITY OF DRY SLUDGE

WEATHER CONDITIONS Ave 42.0° Hig. 74° Low 18° _____ AVERAGE TEMP. OF RAW SE

OTHER REMARKS _____

HLY REPORT OF OPERATION

Date NOVEMBER

EIM BIOCHEMICAL TREATMENT

EAST CHICAGO, INDIANA

CORNEL A. LEAHU, Superintend

	PRIMARY EFFLUENT			FINAL EFFLUENT																		AERATION: MIXED LIQUOR					AERATION: RETURN SLUDGE		SLUDGE DIGESTIO								
SEDIMENTATION	PH	5 DAY B.O.D. MG./L.	SUSP. SOLIDS MG./L.	PH	5 DAY B.O.D. MG./L.	SUSP. SOLIDS MG./L.	TEMP F	ALKALINITY MG./L.	D. O. MG./L.	C. O. D. MG./L.	TOTAL AMMONIA NH3 MG./L.	CYANIDE CN- MG./L.	OIL MG./L.	PHENOLS MG./L.	CHROMATE MG./L.	IRON MG./L.	PHOSPHATE MG./L.	NITRATE MG./L.	NITRITE MG./L.	CONDUCTIVITY	SETTLEABLE SOLIDS IN 30 MINUTES	SUSP. SOLIDS MG./L.	SLUDGE INDEX	DISSOLVED OXYGEN MG./L.	AIR USED IN AERATION MILLION CU. FT.	VOLUME M.G.D.	SUSP. SOLIDS MG./L.	WASTE ACT. SLUDGE TO DIGESTER - GALX 1000	RAW SLUDGE TO DIGESTER - GALX 1000	TOTAL SOLIDS IN RAW SLUDGE - %	TOTAL VOL. SOLIDS IN RAW SLUDGE - %	TEMP. IN DIGESTER F	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT DISPOSAL
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	
	7.4	83	72	7.3	4	11	65	180	6.6	49	8.05	.115		.011							150	1556	96	2.2	9.73	3.77	6430	59	39	2.8	64	93	6.1	15.2	15.3	5
	7.4	90	52	7.4	3	3	66	204	6.2	23	7.80	.007		.003							140	1448	97	1.4	9.25	3.70	6110	135	36	4.2	67	93	6.0	15.4	15.6	3
	7.4	99	76	7.4	3	11	65	206	6.2	37	11.20	.120		.006			3.6				140	1620	86	1.2	9.27	3.81	7200	102	36	4.4	73	94	6.1	35.8	21	3
	7.5	115	39	7.4	4	22	62	194	5.8	29	9.38	.070		.002							150	1408	107	3.2	9.59	3.57	5960	59	36	3.9	68	92	6.1	25.4	21.8	12
							62	190		34	9.24	.060		.004											8.37	3.70		29	39			92		8.0	8.9	
							65	176		31	6.58	.160		.006											9.22	3.68		60	36			95		25.1	21.6	
	7.6	122	37	7.4	14	3	66	200	6.6	34	6.58	.160		.008							150	1592	94	1.4	9.37	3.47	5920		39	3.6	71	95	6.2	11.9	13.4	
	7.5	103	40	7.4	15	2	64	166	6.2	29	5.67	.040		.000			4.8				150	1652	91	1.2	9.40	3.59	4740	45	39	3.4	65	96	6.1	35.3	34.2	
	7.5	31	48	7.4	13	7	62	168	5.8	22	4.62	.010		.006							140	1572	89	1.6	9.49	3.59	6000	31	36	3.2	44	95	5.8	15.5	16.3	
							62	194		2	10.50	.170		.004											9.50	3.56		44	34			96		34.0	34.0	5
	7.3	52	56	7.4	2	4	64	196	5.4	38	5.12	.160		.007							150	1800	83	1.2	9.42	3.59	5370	50	36	3.8	65	94	6.9	19.8	19.3	3
							66	186		31	10.50			.004			4.6								9.38	3.58		27	39			96		29.2	29.0	5
							62	150		25	7.35			.002											9.50	3.53		35	36			95		15.0	15.0	3
	7.6	122	36	7.3	12	9	62	190	5.2	23	5.95	.150		.0[illegible]							130	1792	73	2.8	9.59	3.63	6690	64	36	5.0	60	95	6.0	29.5	30.0	3
	7.7	56	36	7.5	15	27	62	184	6.2	27	7.70			.044							135	1860	73	1.6	9.25	3.63	6870	44	39	4.2	67	94	6.2	33.5	34.0	
	7.3	77	33	7.8	14	6	66	220	5.6	29	15.20	.180		.009			4.2				135	1508	90	1.2	9.22	3.67	4950	56	36	3.5	47	96	6.2	33.5	33.7	3
	7.6	67	59	7.5	16	19	58	220	6.0	44	16.00	.200		.012							140	2076	67	1.2	9.39	3.70	6710	56	39	5.0	60	95	6.3	20.8	20.1	3
	7.6	69	66	7.4	11	7	61	212	5.6	81	18.27	.200		.014							140	1572	89	1.2	9.55	3.65	6210	32	36	5.5	67	94	6.2	15.9	15.6	
							60	202		18	15.40			.018											9.49	3.56		42	39			94		15.0	14.3	3
							61	216		20	21.70			.020											9.42	3.52		53	36			97		17.4	17.4	
	8.0	40	61	7.6	0.2	10	62	220	6.2	34	14.70			.006							140	2132	66	3.6	9.53	3.61	6730	35	36	3.3	76	95	7.1	23.3	23.1	
	7.8	55	36	7.6	14	7	62	222	7.2	41	17.64	.080		.008							120	1424	84	2.8	9.38	3.64	5680	50	39	4.5	59	95	7.1	34.5	34.6	
	8.2	72	62	7.7	1	4	61	246	6.4	66	17.50	.200		.008			0.2				130	1812	72	1.2	9.41	3.63	6740	36	36	2.9	60	95	7.1	37.1	38.7	
							60	248		0	21.00	.160		.008											9.52	3.54		61	39			96		39.5	31.2	
	8.1	75	105	7.6	9	10	62	222	6.2	0	17.15	.120		.007							130	1424	91	2.6	9.39	3.57	7090		36	3.7	67	96	7.1	28.0	28.2	
							61	162		0	16.80			.008											9.41	3.50			39			96		33.2	32.2	
							56	160		0	11.90			.008											9.51	3.83		52	36			97		36.0	36.1	
	8.1	95	61	7.7	9	19	56	210	6.8	13	14.70	.160		.008							160	2688	60	3.2	8.48	3.99	4920	39	39	3.6	39	97	7.2	54.2	55.6	
	7.9	53	55	7.7	13	26	56	228	6.6	37	14.35	.240		.008							130	1640	79	3.6	9.54	4.06	11040	39	35	3.6	56	98	7.2	39.3	39.8	
	7.8	46	58	7.7	0	12	56	224	6.8	49	13.30	.240		.012			1.2				140	2124	66	3.6	9.56	4.12	6960	101	36	4.0	45	97	7.2	32.0	32.4	
		1462	1088		172.2	219		5996		846	364.8						18.6					54700			281.1	118.2		1435	1117					767.7	752.3	45
	7.7	73	54	7.5	9	11	62	200	6.2	33	12.16	.196		.261			3.1				140	1735	83	2.1	9.37	3.97	6416	51	37	3.9	61	94	6.5	256	25.1	3
	C	C	C	C	C	C	C	C	C	C	C	C		.008			C			C	C	C		C			C			C	C	·	C				C
	12	12	12	12	12	12	1	12	12	12	12	12		12			12				12	12		12			12			1	1	1	1				1

, IN WHAT PERIOD NONE

OF DRY SLUDGE REMOVED NONE

EMP. OF RAW SEWAGE 63°

Date NOVEMBER, 1965

CORNEL A. LEAHU, Superintendent

				AERATION							SLUDGE DIGESTION													
				MIXED LIQUOR					RETURN SLUDGE															
PHOSPHATE MG./L.	NITRATE MG./L.	NITRITE MG./L.	CONDUCTIVITY	SETTLEABLE SOLIDS IN 30 MINUTES	SUSP. SOLIDS MG./L.	SLUDGE INDEX	DISSOLVED OXYGEN MG./L.	AIR USED IN AERATION MILLION CU. FT.	VOLUME M.G.D.	SUSP. SOLIDS MG./L.	WASTE ACT. SLUDGE TO DIGESTER - GALX 1000	RAW SLUDGE TO DIGESTER - GALX 1000	TOTAL SOLIDS IN RAW SLUDGE - %	TOTAL VOL. SOLIDS IN RAW SLUDGE - %	TEMP. IN DIGESTER F	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN GAL. X 1000	SOLIDS IN SUPERNATANT %	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE %	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE %
50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
				150	1556	96	2.2	9.70	3.77	6430	59	39	2.8	64	93	6.1	152	153	59.0	1.0		3.0	58
				140	1448	97	1.4	9.25	3.70	6110	135	36	4.2	67	98	6.0	154	156	36.0	2.1		2.8	79
3.6				140	1620	86	1.2	9.27	3.81	7200	102	36	4.4	73	94	6.1	158	2.1	36.0	1.8	24	2.8	64
				150	1408	107	3.2	9.59	3.57	5960	59	36	3.9	68	92	6.1	254	21.8	12.0	0.2	30	3.1	73
								8.37	3.70		29	39			92		8.0	8.9					
								9.22	3.68		60	36			95		25.1	21.6			30		
				150	1592	94	1.4	9.37	3.47	2120		39	3.6	71	95	6.2	11.9	13.4		4.0	42	2.5	75
4.8				150	1652	91	1.2	9.40	3.59	4740	45	39	3.4	65	96	6.1	35.3	34.2		3.0	27	3.0	67
				140	1572	89	1.6	9.49	3.59	6000	31	36	3.2	44	95	5.8	15.5	16.3		2.5		3.0	62
								9.50	3.56		44	34			96		34.0	34.0	39.0				
				150	1800	83	1.2	9.42	3.59	5370	50	36	3.8	65	94	6.9	19.8	19.3	36.0	2.6		3.4	65
4.6								9.38	3.58		27	39			96		29.2	29.0	39.0				
								9.50	3.53		35	36			95		15.0	15.0	36.0				
				130	1792	73	2.2	9.59	3.63	6690	64	36	5.0	60	95	6.0	29.5	30.0	36.0	1.6	39	2.6	69
				135	1860	73	1.6	9.25	3.63	6870	44	39	4.2	67	94	6.2	33.5	34.0		3.7		3.7	88
4.2				135	1508	90	1.2	9.22	3.67	4950	56	34	3.5	47	96	6.2	33.5	33.7	36.0	3.2		3.8	47
				140	2076	67	1.2	9.39	3.70	6710	56	39	5.0	60	95	6.3	20.8	20.1	39.0	3.6	39	4.5	61
				140	1572	89	1.2	9.55	3.65	6210	32	36	5.5	67	94	6.2	15.9	15.6		5.4		8.6	78
								9.49	3.56		42	39			94		15.0	14.3	36.0				
								9.48	3.52		53	36			97		17.4	17.4			36		
				140	2132	66	3.6	9.53	3.61	6730	35	36	3.3	76	95	7.1	23.3	29.1			39	2.4	82
				120	1424	84	2.8	9.38	3.64	5680	50	39	4.5	59	95	7.1	34.5	34.6			36	2.9	47
0.2				130	1812	72	1.2	9.41	3.63	6740	36	36	2.9	60	95	7.1	37.1	38.7			39	1.6	75
								9.52	3.54		61	39			96		39.5	31.2			33		
				130	1424	91	2.6	9.39	3.57	7090		36	3.7	67	98	7.1	28.0	28.2		2.9		2.9	79
								9.41	3.50			39			96		33.2	32.2			36		
								9.51	3.83		52	36			97		36.0	32.1			27		
				160	2688	60	3.2	5.48	3.99	4920	39	39	3.6	39	97	7.2	54.2	55.6				2.0	60
				130	1640	79	3.6	9.54	4.06	10040	39	39	3.6	56	98	7.2	29.3	29.8		3.6	33	2.2	45
1.2				140	2124	66	3.6	9.56	4.12	6960	101	36	4.0	45	97	7.2	32.0	32.4		1.0		2.4	50
18.6					34700			28.1	11.82		1435	1.117					762.7	752.5	452.0		510		
3.1				140	1735	83	2.1	9.57	3.97	6416	51	37	3.9	61	94	6.5	256	25.1	38.0	2.6	34	2.9	66
C			G	C	C		C			C			G	G	·	G			G	G	G	G	G
12				12	12		12			12			1	1	1	1			1	1	1	1	1

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	10	46
SECONDARY TREATMENT	79	42
OVERALL TREATMENT	89	88

DETENTION TIME HRS.	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.38	1.83	2.12
AERATION TANK	3.79	3.10	3.31
FINAL SETTLING TANK	3.49	2.87	3.12

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			722
FINAL SETTLING TANK			463

WIER OVERFLOW RATE GAL./FT. OF WIER/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			14,456
FINAL SETTLING TANK			11,571

EQUIV. POP. TREATED 48,316
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.863
C. F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1,432
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	36.4

TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C. F. GAS PROD/DAY/LB. V. S. ADDED	

MAN DAYS AT PLANT _____ PAYROLL/MO. $ 5070.68
ELECTRICITY PURCHASED _____ K.W.H. $ 769.31
GAS PURCHASED _____ C. F. $ 218.51
CHEMICALS & SUPPLIES $ _____
MAINTENANCE Fuel Oil $ 395.20
OTHER COSTS $ _____
TOTAL $ 6,453.70
COST/M.G. SEW. TREAT. $ 19.80
COST/CAPITA/MO. $ 0.113
COST/1000 LB. B.O.D. REMOVED $ 32.93
REVENUE RECEIVED $ _____

MONTHLY REPORT ON BACTERIOLOGICAL EXAMINATION

MONTH JUNE, 1965

SEWAGE TREATMENT PLANT

EAST CHICAGO, INDIANA

DAY OF MONTH	DAY OF WEEK	LAURYL TRYPTOSE BROTH POSITIVE TUBES TUBES PER DILUTION 5								M.P.N. PER 100 ML	B. G. B. POSITIVE TUBES				COLIFORM CONFIRMED 35° 20° PLATE COUNT				CHLORINE RESIDUAL	REMARKS
		24 HR.				48 HR.					24 HR L.T.B.		48 HR L.T.D.							
		1/10	1/100	1/1000	1/10000	1/10	1/100	1/1000	1/10000		24 HR B.G.B.	48 HR B.G.B.	24 HR B.G.B.	48 HR B.G.B.	1/10	1/100	1/1000	1/10000		
1	T																			
2	W																		0.6	
3	TH																		0.4	
4	F																		1.3	
5	S																			
6	SU																			
7	M																			
8	T																		1.0	
9	W																		0.9	
10	TH																		0.7	
11	F																		0.8	
12	S																		1.2	
13	SU																			
14	M																			
15	T																		1.0	
16	W																		1.3	
17	TH																		1.4	
18	F																		1.2	
19	S																		1.2	
20	SU																			
21	M	1	0	0	0	2	0	0	0	91	+				7	0			1.0	
22	T	1	0	0	0	2	1	0	0	150	+				10	0			1.1	
23	W	2	0	0	0	2	1	0	0	150	+				10	0			1.0	
24	TH																			
25	F																			
26	S																			
27	SU																			
28	M	1	1	0	0	2	1	0	0	150	+				10	0			1.4	
29	T	1	1	0	0	1	1	0	0	73	+				15	0			1.1	
30	W	1	0	0	0	1	1	0	0	73	+				10	0			1.2	
31																				

EAST CHICAGO SANITARY DISTRICT STARTED THE BACTERIOLOGICAL EXAMINATION OF ITS CHLORINATED WASTE WATER

MONTHLY REPORT ON BACTERIOLOGICAL EXAMINATION

MONTH JULY 1965

SEWAGE TREATMENT PLANT

EAST CHICAGO, INDIANA

DAY OF MONTH	DAY OF WEEK	LACRYL TRYPTOSE BROTH POSITIVE TUBES TUBES PER DILUTION 3 24 HR. 1/10	24 HR. 1/100	24 HR. 1/1000	24 HR. 1/10000	48 HR. 1/10	48 HR. 1/100	48 HR. 1/1000	48 HR. 1/10000	M.P.N. PER 100 ML	B. C. D. POSITIVE TUBES 24 HR L.T.B. 24 HR B.C.B.	24 HR L.T.B. 48 HR B.C.B.	48 HR L.T.B. 24 HR B.C.B.	48 HR L.T.B. 48 HR B.C.B.	COLIFORM CONFIRMED 35° PLATE COUNT 1/10	1/100	1/1000	1/10000	REMARKS CHLORINE RESIDUAL
1	TH																		1.3
2	F																		1.2
3	S																		
4	SU																		
5	M																		
6	T																		0.8
7	W																		0.8
8	TH																		
9	F																		
10	S																		
11	SU																		
12	M																		
13	T																		
14	W																		
15	TH																		
16	F																		
17	S																		
18	SU																		
19	M																		
20	T																		
21	W																		
22	TH																		
23	F																		
24	S																		
25	SU																		
26	M	2	0	0	0	2	2	0	0	210	+				15	0			1.2
27	T	1	0	0	0	2	1	0	0	150	+				15	0			
28	W	1	0	0	0	2	1	0	0	150	+				10	0			
29	TH																		1.3
30	F																		1.3
31	S																		

CHEMIST ON VACATION FOR THREE WEEKS IN THE MONTH OF JULY.

300

MONTHLY REPORT ON BACTERIOLOGICAL EXAMINATION

SEWAGE TREATMENT PLANT

MONTH August - 1965

EAST CHICAGO, INDIANA

DAY OF MONTH	DAY OF WEEK	LACRYL TRYPTOSE BROTH POSITIVE TUBES TUBES PER DILUTION 3								M.P.N. PER 100 ML	B. G. B. POSITIVE TUBES				COLIFORM COMPIRMED 35° ±0° PLATE COUNT				Chlorine Residual	REMARKS
		24 HR.				48 HR.					24 HR L.T.B.		48 HR L.T.B.							
		1/10	1/100	1/1000	1/10000	1/10	1/100	1/1000	1/10000		24 HR B.G.B.	48 HR B.G.B.	24 HR B.G.B.	48 HR B.G.B.	1/10	1/100	1/1000	1/10000		
1	Su																			
2	M	1	0	0	0	1	1	0	0	73	+								0.5	
3	T	1	0	0	0	1	1	0	0	73	+								1.3	
4	W	1	0	0	0	3	0	0	0	230	+								1.5	
5	Th																		1.2	
6	F																		1.2	
7	S																			
8	Su																			
9	M	1	1	0	0	1	1	0	0	73	+								0.3	
10	T	1	1	0	0	1	2	0	0	110	+								1.1	
11	W	1	0	0	0	1	1	0	0	73	+								1.2	
12	Th																		1.9	
13	F																		1.2	
14	S																			
15	Su																			
16	M	0	0	0	0	2	0	0	0	91	+				10	0			0.8	
17	T	1	0	0	0	2	1	0	0	150	+				15	0			0.6	
18	W	2	2	0	0	3	2	0	0	930	+				25	0			1.0	
19	Th																		0.8	
20	F																		1.0	
21	S																			
22	Su																			
23	M	3	0	0	0	3	0	0	0	230	+				10	0			0.6	
24	T	2	0	0	0	2	0	0	0	91	+				5	0			1.6	
25	W	1	1	0	0	1	1	0	0	73	+				7	0			1.3	
26	Th																		1.4	
27	F																		0.8	
28	S																			
29	Su																			
30	M	3	0	0	0	3	1	0	0	430	+				10	0	0	0	0.7	
31	T	1	0	0	0	2	1	0	0	150	+				20	0	0	0	1.3	

MONTHLY REPORT ON BACTERIOLOGICAL EXAMINATION

SEWAGE TREATMENT PLANT

MONTH SEPTEMBER 1965

EAST CHICAGO, INDIANA

DAY OF MONTH	DAY OF WEEK	LAURYL TRYPTOSE BROTH POSITIVE TUBES — TUBES PER DILUTION 3 — 24 HR. 1/10	24 HR. 1/100	24 HR. 1/1000	24 HR. 1/10000	48 HR. 1/10	48 HR. 1/100	48 HR. 1/1000	48 HR. 1/10000	M.P.N. PER 100 ML	B. G. B. POSITIVE TUBES — 24 HR L.T.B. 24 HR B.G.B.	24 HR L.T.B. 48 HR B.G.B.	48 HR L.T.B. 24 HR B.G.B.	48 HR L.T.B. 48 HR B.G.B.	COLIFORM CONFIRMED 350° PLATE COUNT 1/10	1/100	1/1000	1/10000	REMARKS CHLORINE RESIDUAL
1	W	3	0	0	0	3	1	0	0	430	+				40	0			1.3
2	TH																		1.0
3	F																		1.0
4	S																		
5	SU																		
6	M																		
7	T	0	0	0	0	0	0	0	0	00	-	-			10	0			1.9
8	W	3	0	0	0	3	2	0	0	930	+	-			70	10			1.5
9	TH																		1.8
10	F																		1.6
11	S																		
12	SU																		
13	M	0	0	0	0	2	2	0	0	210	+	-			30	0			1.4
14	T	3	1	0	0	3	1	0	0	430	+	-			20	10			2.0
15	W	2	1	0	0	3	2	0	0	930	+	-			30	0			1.8
16	TH																		1.8
17	F																		1.6
18	S																		
19	SU																		
20	M	2	1	0	0	3	1	0	0	430	+	-			20	0			1.4
21	T	3	2	0	0	3	2	0	0	930	+	-			40	0			1.5
22	W																		1.3
23	TH																		1.1
24	F																		2.0
25	S																		
26	SU																		
27	M	1	0	0	0	2	1	0	0	150	+	-			20	0			0.7
28	T	2	0	0	0	3	0	0	0	230	+	-			30	0			1.4
29	W	2	1	0	0	2	1	0	0	430	+	-			30	0			1.0
30	TH																		1.2

MONTHLY REPORT ON BACTERIOLOGICAL EXAMINATION

MONTH OCTOBER 1965

SEWAGE TREATMENT PLANT

EAST CHICAGO, INDIANA

DAY OF MONTH	DAY OF WEEK	LAURYL TRYPTOSE BROTH POSITIVE TUBES — TUBES PER DILUTION 3 — 24 HR. 1/10	24 HR. 1/100	24 HR. 1/1000	24 HR. 1/10000	48 HR. 1/10	48 HR. 1/100	48 HR. 1/1000	48 HR. 1/10000	M.P.N. PER 100 ML	B. G. B. POSITIVE TUBES — 24 HR L.T.B. — 24 HR B.G.B.	24 HR L.T.B. — 48 HR B.G.B.	48 HR L.T.D. — 24 HR B.G.B.	48 HR L.T.D. — 48 HR B.G.B.	COLIFORM CONFIRMED 35° PLATE COUNT 1/10	1/100	1/1000	1/10000	REMARKS — CHLORINE RESIDUAL
1	F																		.4
2	S																		
3	SU																		
4	M	3	3	3	3	3	3	3	3	11,000+	+				300	100			.1
5	T	3	3	3	3	3	3	3	3	11,000+	+				300	100			.1
6	W	3	3	3	3	3	3	3	3	11,000+	+				400	200			.2
7	TH																		.2
8	F																		.2
9	S																		
10	SU																		
11	M	3	3	3	3	3	3	3	3	11,000+	+				400	200			.2
12	T	3	3	3	3	3	3	3	3	11,000+	+				350	200			.1
13	W	3	3	3	3	3	3	3	3	11,000+	+				400	200			.2
14	TH																		.2
15	F																		.2
16	S																		
17	S																		
18	M	3	3	0	0	3	3	1	0	4,600	+				10	0			1.0
19	T	3	2	1	0	3	3	1	0	4,600	+				7	3			1.0
20	W	1	0	0	0	2	1	0	0	150					12	0			.8
21	TH																		0.7
22	F																		1.0
23	S																		
24	SU																		
25	M	2	2	0	0	3	2	0	0	930	+				80	10			.4
26	T	3	3	3	1	3	3	3	3	11,000					200	80			.1
27	W	3	3	3	1	3	3	3	3	11,000					400	100			.1
28	TH																		.1
29	F																		.1
30	S																		
31	SU																		

MONTHLY REPORT ON BACTERIOLOGICAL EXAMINATION

SEWAGE TREATMENT PLANT

MONTH NOVEMBER 1965

EAST CHICAGO, INDIANA

DAY OF MONTH	DAY OF WEEK	LAURYL TRYPTOSE BROTH POSITIVE TUBES TUBES PER DILUTION 3								M.P.N. PER 100 ML	B. G. B. POSITIVE TUBES				COLIFORM CONFIRMED 35° 37° PLATE COUNT				CHLORINE RESIDUAL	REMARKS
		24 HR.				48 HR.					24 HR L.T.B.		48 HR L.T.B.							
		1/10	1/100	1/1000	1/10000	1/10	1/100	1/1000	1/10000		24 HR B.G.B.	48 HR B.G.B.	24 HR B.G.B.	48 HR B.G.B.	1/10	1/100	1/1000	1/10000		
1	M	3	0	0	0	3	1	0	0	430	+	–			2	0			.1	
2	T	3	1	0	0	3	3	1	0	4,600	+				60	0			.2	
3	W	3	3	3	3	3	3	3	3			upca			400	100			.2	
4	TH																		.2	
5	F																		.2	
6	S																			
7	SU																			
8	M	0	0	0	0	3	1	0	0	430	+				4	0				
9	T	2	1	0	0	3	3	0	0	2,400	+				10	0			.2	
10	W	3	1	0	0	3	2	0	0	930	+				30	0			2	
11	TH																		.2	
12	F																		.2	
13	S																		.2	
14	SU																			
15	M	2	1	0	0	3	2	0	0	930	+				20	0			.1	
16	T	2	0	0	0	3	1	0	0	430	+				30	0			.2	
17	W																		.1	
18	TH																		.1	
19	F	3	1	0	0	3	2	0	0	930	+				60	0			.1	
20	S	3	3	3	3	3	3	3	3	11,000+	+				300	0				
21	SU	2	1	0	0	3	3	0	0	2,400	+				12	0				
22	M	2	0	0	0	3	1	0	0	430	+				30	0			.3	
23	T	3	2	0	0	3	3	0	0	2,400	+				10	0			.6	
24	W	1	1	0	0	3	3	0	0	2,400	+				7	0			.3	
25	TH	1	0	0	0	3	3	3	3	11,000	+				3	0				
26	F	3	3	0	0	3	3	0	0	2,400	+				35	10			.2	
27	S	3	3	1	0	3	3	2	0	11,000+	+				100	5				
28	SU	3	2	0	0	3	3	2	0	11,000+	+				10	0				
29	M	1	0	0	0	3	3	0	0	2,400	+				7	0			.1	
30	T	2	2	0	0	3	3	3	0	11,000+	+				15	0			.4	
31																				

304

A. G. Giannini

MR. STEIN: Mr. Poole.

MR. POOLE: I am now going to call on the city of Hammond. I understand Mayor Edward Dowling is unable to be here, but I know from past experience he is going to be very ably represented by Mr. A. G. Giannini, who is city engineer and also a member of the Board of Sanitary Commissioners of the city of Hammond.

STATEMENT OF

A. G. GIANNINI, CITY ENGINEER,

HAMMOND, INDIANA

MR. GIANNINI: Mr. Chairman, conferees, ladies and gentlemen:

Mr. Perry Miller pretty well summed up the progress that has been made in our city during his report for the Indiana Stream Pollution Control Board. About all we can add at this time is some later data, some occurrences that took place as late as last week which, you might say, might update his report. We will have a few comments that we will want to make, and it will be a very short one.

First of all, Hammond has the unique distinction within the Chicago Greater Metropolitan Sanitary District of being involved in the pollution of the four major basins, Lake Michigan, Wolf Lake, Grand Calumet River and the Little Calumet River.

A. G. Giannini

LAKE MICHIGAN

Storm water discharging from the Robertsdale Pumping Station into Lake Michigan remains unchanged since our report in February 1965. Until Federal funds are made available to complete the separation of combined sewers in the Robertsdale area, Hammond cannot hope to make further progress in the immediate future. The Hammond Sanitary District is bonded to its legal limits with other important problems requiring immediate attention.

WOLF LAKE

The storm water pumping station at Calumet and Sheffield Avenues will be completed in the spring of 1966. The storm sewer for this station was completed in 1965. A sanitary sewer for Sheffield Avenue was also completed in 1965 and will be used as soon as the sanitary pumping station is completed at 129th Street in 1966. This should eliminate some septic tanks in the vicinity of Wolf Lake.

GRAND CALUMET RIVER

The Sanitary Board rejected bids for chlorination equipment to disinfect the treatment plant effluent in December of 1965 because the bids exceeded engineers' estimates. New bids will be received in February 1966 and construction for tertiary treatment of the plant effluent completed in 1966. The Sanitary District is proceeding with the chlorina-

tion facilities because the Army Engineers have indicated the control dam on the Grand Calumet River will be located west of our plant outfall. We favor this location.

The north side storm relief sewer is under construction along with the Johnson Avenue pumping station. Both are to be completed in 1966 and the pumping station will discharge storm water into the Grand Calumet River.

LITTLE CALUMET RIVER

The Sanitary Board made a tentative award at the end of 1965 for the construction of the Southside Interceptor Sewer along the Tri-State Highway on the north side of the Little Calumet River. This sanitary sewer will provide for additional sanitary waste from the towns of Griffith and Highland as well as the undeveloped southeast section of Hammond. The relief sewer is expected to be completed in 1966 or early 1967.

The town of Highland is installing a connection from its Indianapolis Boulevard station to the new sanitary relief sewer. The new tie-in will be completed this year.

During 1965 the towns of Griffith, Highland and Munster experienced considerable home building and expansion in general. The Sanitary Board contracted, in 1965, to increase the pumping capacity of the South Columbia Avenue station to meet the anticipated additional sanitary flows from

these towns now under contract with Hammond for sewage treatment service.

Now to a few of the comments which may not be too well accepted from what I have heard. I will have to go through them because they are on paper. I won't be able to retract them.

COMMENTS

The Hammond Sanitary District has initiated an extensive sewer program which will ultimately result in separate storm and sanitary sewer systems.

All new sewers, except storm relief sewers, are being constructed as strictly separate sanitary sewers or strictly separate storm sewers. For instance, the Southside interceptor, for which a Federal grant has been awarded, is intended for sanitary waste. Sanitary relief sewers being constructed are arranged so that they can be easily converted to storm sewers under the next phase of the sewer improvement program. Some separate storm sewers are already in service in the Robertsdale area, which are pumped directly into Wolf Lake. All new subdivisions are required to install completely separate sewers.

After a hurried perusal of the Report of Water Quality Criteria Calumet Area - Lower Lake Michigan, it appears that criteria will have to be reconsidered as

conditions change and as more experience is gained by everyone concerned.

It has to be recognized that additional data analysis will be required before phosphate criteria can be established. We also realize that to meet the established criteria some additional treatment plant additions may be necessary in the near future, such as additional aeration tanks and secondary settling tanks. If the Indiana Stream Pollution Control Board or the State Board of Health at any time requests improvement of our plant effluent the Hammond Sanitary Board will attempt to cooperate in any feasible manner. The Sanitary Board and the city of Hammond is desirous of cooperating with all participating agencies as we have always done in the past. We fully realize the importance of clean streams and lakes.

On page 18 of the Water Quality Criteria Report is the following sentence which cannot go unnoticed: "Combined storm water overflows shall be eliminated as soon as possible."

In our previous report -- and I might say this was in February of 1965 -- we pointed out that Hammond will require from 60 to 100 years to completely separate its combined storm water overflows at an estimated cost of $60,000,000. Federal grants to accomplish this in a short time appear to be

the only answer at this writing.

I must digress here, Mr. Stein, and ask you to read those last two sentences, and if you think they will be accepted in the proper spirit of a little levity to close this off, I would like to read them. Otherwise I will go by your judgment and end my report as I have.

MR. STEIN: You don't want to read the rest?

MR. GIANNINI: Not unless you will approve it. I am afraid it might be misunderstood.

MR. STEIN: It won't be misunderstood by me.

MR. GIANNINI: Very well, sir.

A nation that can spend five billion dollars a year to get one man to the moon can surely find several billion dollars a year to improve the important water resources of our nation -- unless, of course, Health, Education, and Welfare is planning to move all of our people to the moon and avoid this expenditure by our local taxpayers.

(Laughter and applause.)

MR. STEIN: You know, you people in Indiana seem to have a fixation on the moon, but so far you have confined it to the Wabash. (Laughter)

MR. GIANNINI: And it is a beautiful moon over the Wabash. I can testify. I went to Purdue.

MR. KLASSEN: You are building up our hopes about

them all going to the moon.

MR. GIANNINI: No, we don't want to build up the hopes. We have got a lot of work to do right here.

MR. STEIN: Thank you for your statement.

Any comments or questions?

COLONEL CHESROW: Mr. Chairman, --

MR. STEIN: Yes, Colonel Chesrow?

COLONEL CHESROW: I would just like to point out that the success of any venture is based on mutual cooperation. Just recently we had an opportunity of participating in just that. Mr. Giannini on December 24 called upon us to defend Hammond from becoming inundated because of that heavy rainfall, and we were most happy he did.

Before he hung up we had opened up the gates of the O'Brien Locks and averted the waters that were threatening him.

MR. GIANNINI: Mr. Chairman, if I may, I would like to thank Colonel Chesrow at this time. I would like to add too that what is happening at these conferences is something I learned a good many years ago working with people in the Chicago Water Department -- for instance, Hy Gerstein.

We used to work together on threshold odors and the problems of water pollution, trying to clean up our drinking water. I was in Hammond. Hy and Jimmy Vaughn were

A. G. Giannini

in Chicago.

Now I have the distinct pleasure of working with Mr. Chesrow still on flood control and later now water pollution.

But these are problems that are inherent to the whole region, and we are happy to work with him. We have always found it was to our advantage to work with people like Mr. Gerstein and Mr. Chesrow.

Thank you again.

MR. STEIN: Mr. Poston.

MR. POSTON: I noticed in your report that you have turned down the bids for chlorination equipment which were submitted in December of this past year and that you are going to receive new bids in February of 1966.

I wondered if you would have some estimate, assuming that the bids would be acceptable in the next letting, of when you might provide chlorination treatment for your plant effluent.

We think that by fall, around October 1, this project could be completed. We are making some redesign now which is delaying the taking of bids probably a couple of weeks, but by March 1st we hope to have it all under contract and starting March 15th.

We think by October there shouldn't be any problem

on getting this tertiary treatment started. We fully intend to push the project and get it under way as soon as we can.

MR. POSTON: When you refer to "tertiary" treatment you are referring to chlorination in addition to your activated sludge treatment?

MR. GIANNINI: That's right. We understand that maybe crossing State lines meanings change, but tertiary treatment to us would mean lagooning and chlorination, disinfecting of the effluent. Is that correct?

MR. POSTON: That is your terminology?

MR. STEIN: You wouldn't disagree?

MR. POSTON: No.

MR. GIANNINI: I heard the remark earlier that across State lines sometimes meanings change.

MR. STEIN: We would like to get as much area of agreement as we can on the terms. I think it is pretty generally accepted that, after second treatment, if you provide lagooning and chlorination or disinfection, that is considered tertiary.

MR. GIANNINI: We are going to approach that as quickly as possible.

MR. KLASSEN: Maybe I just wasn't listening, but, in other words, do I understand that Hammond will not be chlorinating even temporarily until at least October 1, 1966?

A. G. Giannini

MR. GIANNINI: That is correct, Mr. Klassen. We have no means of putting in any temporary equipment, so we are going to go ahead and make a final installation.

The reason for this delay might be of interest to you. We would have done it sooner but we had to get bonding power through our State legislature which met last year, which became available to us. Plans had to be drawn, and the usual government red tape delayed us this long. If we could go out and borrow the money like private industry, I'm sure it would have been accomplished before now, because we heartily endorse the program.

MR. STEIN: Mr. Poston.

MR. POSTON: In regard to the money matters, I am sure you are aware of the fact that there was a $480,000 construction grant by the Federal government in December of this year and that previous to that some $493,000 had been allocated to Hammond for construction of waste treatment work.

MR. GIANNINI: Yes. I think I made mention of it here that the Southside interceptor is receiving some $300,000 of this $400,000. The rest of it is going for chlorination. But it is only 30 per cent of the total cost.

If we hadn't gotten help from the legislature, even your 30 per cent couldn't have been acceptable to us because we wouldn't have had matching funds.

A. G. Giannini

So we are at a point where we are having to spend it as fast as we get it. Unless it is a hundred per cent or 90 per cent as on the highways, it is going to be more difficult for the cities to keep up with your desires and requests.

MR. STEIN: Thank you, sir.

Are there any further comments or questions?

(No response.)

If not, thank you very much.

MR. GIANNINI: Thank you very much.

MR. STEIN: Mr. Poole.

MR. POOLE: I think I would be remiss if I didn't say to the audience that it has been my pleasure and sometimes chore to work with several hundred Indiana cities and towns for too many years now, and the cooperation we have experienced out of Gary and East Chicago and Hammond in connection with this subject under discussion here is among the best that I have experienced at any time or any place throughout the State of Indiana.

Personally I have high hopes for this East Chicago project, and I hope it can be carried to completion, because it may point the way not only for us in Indiana but also for a good many other places in the country to give us a better grade of sewage treatment than we have today.

A. G. Giannini

I am going to depart from my agenda now for a very few minutes, and, Mr. Johnson, I must emphasize a very few minutes. I have just been notified here by the chairman we are going to take a break.

Mr. Johnson has a problem that is a big problem to the people in his neighborhood but that is relatively minor in so far as this business of the interstate waters that we have under discussion is concerned.

Mr. Johnson.

Clark N. Johnson

STATEMENT OF

CLARK N. JOHNSON, REPRESENTING STREAM POLLUTION COUNCIL, INC.

LAKE COUNTY, INDIANA

MR. JOHNSON: Honorable Chairman, Honorable Conferees, ladies and gentlemen:

I am Clark N. Johnson, representing the South Lake County Stream Pollution Control Council which covers all of Lake County, Indiana.

I would like to present to you the facts concerning pollution in the Black Oak Calumet area. This heavily populated, low-lying area is fast become a catchbasin for the drainage and surplus water from as far south as Crown Point, Indiana. Due to the lack of adequate drainage facilities, there is no place for the water to go once it reaches our community. There the water table in the area rises to a point detrimental to the proper functioning of both private and public septic systems.

Recently this faulty drainage system caused a number of unsightly and unsanitary conditions. Raw sewage from this community spilled into our rivers and streams -- and ultimately contaminating our wells -- not to speak of the densly polluted access waters which flowed into the streets, yards, and even the homes, creating an even greater hazard to the residents of the Black Oak area.

Clark N. Johnson

Our need is embellished when we cite the situation at the John Dullas grade school in Black Oak. There are presently 792 students enrolled. Because of the high water the toilets in that school can be flushed only once a day.

In a careful observation I and a committee of interested individuals of this community have discovered what surely must be the cause of this chaotic situation. The bridges on Harrison, Grant, Taft and Chase Streets which, at one time, carried the water out of our area have been replaced or converted to culverts. These culverts are too inadequate in size to capacitate the Little Calumet River.

If you will notice on the Little Calumet River where the arrows flow to the east and the west, this is where the water from the south part comes in and no longer can go to the west because of blocking of the river and also to the east because of the inadequate facilities to carry the water through to the Burns Ditch.

I might also add that the bridge which used to be across the Little Calumet River on the Pennsylvania Railroad has been converted in recent years to culverts which are not in proper size and not in proper flotation to carry the water off into Lake Michigan.

The solution to our problem is, quite naturally, adequate drainage. Adequate drainage can only be accomplished

by dredging of the Little Calumet River.

We, the residents and property owners of this area, can no longer be forced to live under such unsanitary and hazardous conditions. We ask, if not demand, action now before a serious outbreak of disease occurs and strikes down the people in our area. All that I and our families ask is that we be allowed to live, work, and play in an area that is not continually threatening the well-being of our families.

I'm submitting a complete file, covering in detail the points I have just briefly mentioned.

Thank you.

MR. STEIN: Thank you very much, Mr. Johnson.

Are there any comments or questions?

(No response.)

If not, thank you very much for your contribution. You can be sure we will try to do what we can to look into this problem for you.

(The file submitted by Mr. Johnson is available in the Chicago office of the Federal Water Pollution Control Administration during normal business hours.)

MR. STEIN: Mr. Poole, do you have any more?

MR. POOLE: The next one is U. S. Steel.

MR. STEIN: Next come the Indiana industrial repre-

sentatives, but first we will take a ten-minute recess.

(Whereupon, a recess was taken.)

MR. STEIN: May we reconvene?

Mr. Poole.

MR. POOLE: Next I'm going to call on Herbert J. Dunsmore of United States Steel. He is assistant to the administrative vice president in charge of engineering, and his responsibilities include all of the engineering phases of U. S. Steel's water conservation activities.

He is going to report to us on U. S. Steel's activities in their various plants which have already been discussed in a brief fashion by Mr. Miller.

Herbert J. Dunsmore

STATEMENT OF

HERBERT J. DUNSMORE

ASSISTANT TO THE ADMINISTRATIVE VICE PRESIDENT-

ENGINEERING, UNITED STATES STEEL CORPORATION

MR. DUNSMORE: Mr. Chairman, Conferees and ladies and gentlemen:

I am Herbert J. Dunsmore, Assistant to the Administrative Vice President-Engineering, United States Steel Corporation. I am appearing today as a witness for the Indiana conferee, Mr. Blucher Poole.

Mr. Poole has asked me to report the steps that have been taken to improve the water quality at United States Steel's Gary facilities since the last conference.

About half of the water intake from Lake Michigan is used only for cooling and picks up no wastes.

The other half is distributed throughout the plant for use only for cooling and picks up no wastes.

The other half is distributed throughout the plant for use in the various processes of steelmaking.

I welcome this opportunity to show you the clarifiers, flocculators, settling basins, filtering beds, deep well disposal facility, skimmers, scrubbers, and those facilities that have been installed over the past ten months, or that are now under construction, to protect the quality

Herbert J. Dunsmore

of the water discharged in steelmaking facilities at Gary.

(The following presentation was made with slides.)

BASIC OXYGEN PROCESS SHOP

The new basic oxygen steelmaking shop which was presented in the structural steel stage (Slide 1) at the conference last March is now producing steel for the new John Hancock Building and other steel structures under construction throughout the world. It started making steel in December.

Large quantities of water are used for gas cleaning on the new steel producer and we have taken a series of photos to show you the cleaning facilities whereas last March we only had engineering drawings to show you.

(Slide 2) I think the water handling in this system may be best described by starting with the pumps in each of three cycles and follow the water in each case to its ultimate conditioning and disposal.

These pumps (Slide 3) start the gas cleaning process by forcing water 100 feet to this quenching chamber (Slide 4) above the steelmaking furnace which cools the furnace gas and removes some of the dust.

This 16-foot main (Slide 5) delivers the quenching water and quenched gas into a cleaning process that restores the quality of the water for re-use. The effluent water washes along the bottom of the main to a scupper where solids

are collected and piped to this screen (Slide 6). The screen catches solid particles 1/2 inch or larger and removes them through the chute to the left.

The effluent from the screen section flows to this callow cone (Slide 7) where additional settling takes place.

The solids, gathered in the callow cone, are continually drawn off as a slurry to this thickener (Slide 8) in which the water is clarified by the further settling out of solids.

The clarified water from the thickener is discharged to a sewer leading to the River. The sludge collected at the bottom is pumped to this centrifuge (Slide 9) for dewatering.

The solid cake formed in the centrifuge is trucked to the sintering plant where it is mixed with flue dust from the blast furnace and fused into an iron bearing raw material.

The effluent water from the centrifuge is returned to the thickener.

Now let us return to the furnace gas where we left it, leaving the top of the scupper and entering Venturi scrubbers which wash out the remaining dust particles.

These (Slide 10) are the pumps which supply the water and this (Slide 11) is one of the four Venturis.

Herbert J. Dunsmore

The third set of pumps serve the cooling towers which cool the cleaned gas and settle out some of the dust from the Venturi water. Settling takes place in the bottom of the cooling tower. The partially clarified water is recycled through the Venturis.

Huge fans and stacks discharge the cooled and cleaned gas into the atmosphere.

Here is an overall view (Slide 12) of the cleaning plant. This is the control center (Slide 13).

BLAST FURNACE FLUE DUST

An accelerated cleaning program, illustrated by this grab bucket (Slide 14) loading a truck with flue dust accumulated in the settling basin, provides more efficient flue dust recovery.

(Slide 15) This is a view of two settling basins where the flue dust settles out the blast furnace effluent. The improvement to report in this connection is the raising of the weir level in the basin at the left, thereby increasing basin capacity.

This (Slide 16) oversize test tube actually is a pilot settling basin, and the technicians at the left are obtaining samples for testing sedimentation rate to establish better design parameter to attain improved flue dust retention.

Herbert J. Dunsmore

This is one phase of the plant-wide treatment study now being conducted by an engineering consulting firm. This study is scheduled for completion in December 1966.

THE NEW 84" HOT STRIP MILL

This (Slide 17) is a broadside view of the 84" mill, which was only a sketch in our conference presentation last March.

Mill scale will be the principal waste control problem in this new installation. Hot steel oxidizes rapidly and the scale formed is removed in the rolling process and carried away in a stream of cooling water to scale pits.

Three scale pits have been designed with the latest technology to prevent virtually all of the mill scale and tramp oils from escaping.

This yawning chasm (Slide 18) will become the Roughing Stand Scale Pit, containing two sections. The first section, 58 feet long and 57 feet wide, will trap the heaviest scale. The second section will be 121 feet long, 54 feet wide and have three compartments. The scale will be removed from both sections by an overhead crane equipped with a "clam bucket" and loaded into Dinosaur Boxes for re-use. Tramp oils will be skimmed off and pumped into holding tanks for disposal by an outside firm.

The Finishing Stands Scale Pit will be 110 feet

in length and 54 feet in width. Like the Roughing Stand Pits, it will collect tramp oils as well as scale.

As the steel progresses from the roughing stands through the finishing stands, the scale removed becomes smaller until at the last two stands it will be smaller than one micron size and are difficult to settle out.

The bulldozer in the background (Slide 19) is preparing the site of a sand filter 60 feet wide and 125 feet long which will remove the micron size scale that eludes the pit.

Scale Pit No. 3, under construction at the right, will serve the runout table and coilers at the terminal end of the 84" Mill.

Functioning like its two predecessors this scale pit is 135 feet by 60 feet and will remove scale and tramp oils.

The effluent water from the 84" Mill Waste Water Control Facilities, cooling water and storm water, will reenter Lake Michigan via this (Slide 20) 120" reinforced concrete outfall, while the oil and scale stay on land.

THE NEW SIX-STAND WASTE TREATMENT PLANT

Our discussion of waste treatment facilities on the new 84-inch mill covered waste oil recovery as a scale pit function. Disposal of cold rolling oily wastes is

handled separately. While some of the cold rolling oil readily separates and floats, most of it is emulsified in the water and is difficult to remove.

The presentation of the treatment processes applied to waste cold rolling oils from the new five-stand cold reduction mill attracted the most attention among all the Gary waste treatment facilities described at the conference last March.

Perhaps it was because they are so big -- three times larger than the mill itself -- or so complex.

This (Slide 21) is the five-stand cold reduction mill which occupies approximately 7500 square feet of space while the complex treatment facilities for the cold rolling oils (Slide 22) occupies approximately 24,000 square feet.

This end-product of the treatment facilities for spent cold rolled oils is intercepted before it can reach the river and winds up in tank trucks like this one (Slide 23) for transportation by an outside firm for disposal.

Here (Slide 24) is the new six-stand cold reduction mill, now under construction. It is a larger mill than the five-stand and the cold rolling waste treatment facilities will achieve even higher treatment efficiency.

The conferees may find a schematic presentation of these waste treatment facilities (Slide 25) useful.

Herbert J. Dunsmore

In addition to the waste cold rolling oil of the six stand, these new facilities will treat the cold rolling wastes of the west five-stand Cold Reduction Tin Mill, the three- and four-stand cold reduction sheet mills and the caustic wastes from the new No. 1 Cleaning Line.

The wastes from these mills will enter primary treatment facilities where 40 minutes retention time will enable skimmers to remove the oil that rises to the surface and bottom collectors to remove the settled sludge.

The oil skimmings will be pumped to these concentration tanks and the sludge will be pumped to dragout tanks.

The sludge collected in the dragout tanks will be discharged into Dumpster boxes and hauled to the plant disposal area.

The dragout effluent will return to the primary tanks.

The primary clarified effluent will be discharged to these mixing tanks where waste pickle liquor will be added to break down the emulsion and lime to adjust the pH.

The resultant effluent will flow to the flocculator-clarifier where a large floc will form, which will readily settle to the bottom (during 2-1/4 hours retention time).

This photo (26) of a similar unit now in use indicates the size of the new flocculator-clarifier. The

sludge formed on the bottom will be pumped to the centrifuges for dewatering.

If we will return now to the schematic drawing, the floating scums and oils will be removed by surface skimmer and pumped to the oil concentration tanks.

The dewatered sludge from the centrifuges will be discharged into boxes for disposal by Dumpster trucks at the plant disposal area.

The centrifuge effluent will be returned to the primary tanks.

The treated effluent from the clarifier will be discharged into the Grand Calumet River.

I believe with the use of the chart you will be able to follow that tortuous trip through the plant.

MILL SCALE

We can report two more advances in mill scale recovery since the conference last March.

This (Slide 27) is the scale pit at the 46" Slabbing Mill and the crane operator is lowering a bucketful of mill scale into a recently instituted Dinosaur Dumpster Box which will be trucked away.

This (Slide 28) is the secondary scale pit on the 160"/210" Plate Mill. The pit's three compartments settle out the finer scale particles and skim off surface oil. The

Herbert J. Dunsmore

Dinosaur Dumpster Box is a housekeeping advance at the 160"/210" Plate Mill that has improved the scale pit efficiency.

This (Slide 29) is the excavation for the scale pit which will serve the new Continuous Casting Plant now under construction.

TERMINAL TREATMENT

The change from waste cold rolling oil recovery by mechanical separation for the five-stand cold reduction mill to chemical separation for the new six-stand, the four-stand, the three-stand and the West five-stand mills is part of Gary's overall water conservation program.

The chemical treatment system, adaptable to other mill wastes as well as waste cold rolling oils, permits the expansion of these facilities into a terminal treatment plant which will provide additional treatment for all waste water from the other mills.

A consulting engineering firm is now making a comprehensive study of remaining treatment needs. The study is scheduled to be completed in December 1966.

SPENT PICKLE LIQUOR DISPOSAL

The drilling has been completed for the disposal well, 4300 feet down into the Mt. Simon Sandstone which will absorb the plant's spent sulphuric and hydrochloric

acid wastes, commonly known as pickle liquor.

"Pickling" in steel mill language refers to the immersion in diluted acid solution by which steel is rid of the oxide film which was formed during cooling.

The solution to the stubborn spent pickle liquor disposal problem was developed after geological studies established that deep well injection in the Mt. Simon Strata would not impair the quality of ground or surface water.

Plant engineering people worked closely with Indiana's Stream Pollution Control Board in the design and installation of this deep injection well and, at the Board's request, provided test boring samples throughout its depth. This well should be in operation providing complete disposal of Gary's spent pickle liquor by March 1966.

The next four photos will bring you up to date on the well-drilling progress.

This (Slide 30) is the sump that will collect all the pickling wastes generated at Gary -- first step in deep well injection.

This (Slide 31) framework will house the filters ridding the spent pickle liquor of solids that otherwise might seal off the well face and the pumps for the deep well.

These storage tanks (Slide 32) will provide uniform pumping to well.

Herbert J. Dunsmore

This (Slide 33) is the well head, capping the seven-inch well casing. The casing is in, of course, but the 4-1/2 inch injection tube remains to be installed.

TREATMENT OF CHEMICAL WASTES

At last spring's conference a drawing was shown of the projected chemical waste treatment plant and described as an example of segregating wastes to increase control efficiency.

This new treatment plant will neutralize acid and caustic wastes from No. 5 and No. 6 tinning lines and the HNO_3-HF wastes from the stainless steel pickle lines. The widely varying acid wastes from these processes have one common characteristic; all of them are effectively treated by lime neutralization. Treating the caustic wastes will also be useful in providing some neutralization of the acids.

At this juncture, a progress report may be in order.

These (Slide 34) are the sumps providing for the holding of the different types of waste generated by steel-making processes.

The closest sump collects caustic wastes from the tin mills. The middle sump collects tinning line acid wastes. The farthest sump from us collects stainless steel HNO_3-HF wastes.

This (Slide 35) is the steel framework, which will

house the neutralization equipment.

This plant will occupy a site 100 feet by 135 feet adjacent to our new deep injection well. It was designed in close coordination with the Indiana Stream Pollution Control Board.

This lagoon (Slide 36) will be the final disposal area of the sludge produced by the chemical wastes' neutralization plant.

SANITARY WASTE TREATMENT

As was mentioned by Mayor Katz of Gary, we are now taking steps and are waiting for delivery of equipment so that our coke plant wastes may be treated in the city's sewage treatment plant, in the Gary sewage treatment plant. The remaining sanitary wastes of U. S. Steel's Gary facilities are treated in the city's waste treatment plant.

LABORATORY ANALYSIS OF OUTFALL SAMPLES

In accordance with the recommendations of the conference, effluent samples have been collected at all outfalls and analyzed. The analyses are reported monthly to the Indiana State Health Department.

The technician (Slide 37) takes the sample by lowering container into the outfall.

GRAND CALUMET OIL SKIMMER

As overall waste treatment plans take shape, another

interim measure is being taken which will realize immediate results in water quality improvement. (Slide 38) This is an oil skimmer now being installed in the Grand Calumet just below the last U. S. Steel outfall.

The boom will trap the surface oil for recovery by the skimmer. The recovered oil will be stored in this tank, shown above, now buried underground, for subsequent disposal by an outside firm.

Each of these waste treatment facilities have been developed in close cooperation with the engineering personnel of the Indiana State Health Department and installed under permits issued by the Indiana State Sanitary Water Board.

General

In addition to the abatement program presented above, a consulting engineering firm has been engaged to conduct a study of the remaining industrial waters from operating facilities to ascertain sources that are contributing waste. As each area study is completed, detailed engineering work for treatment facilities, if required, will be initiated so that dates for authorizing and completing each stage of the program can be set. It is anticipated that the entire study will be completed by December 1966.

Again we wish to take this opportunity to thank Mr. Poole for permitting a review of our improvement program

Herbert J. Dunsmore

to the other conferees. These improvements have been made since the last conference at U. S. Steel's Gary facilities.

Thank you.

MR. STEIN: Thank you, Mr. Dunsmore.

Are there any comments or questions?

MR. POSTON: I appreciate your report here, but I don't find all the answers that I think some of the conferees are going to need in order to set some kind of schedules that will be required if the meeting is to be successful, as I view it.

For example, on your ammonia still wastes you indicate these will be put into municipal sewers and receive treatment that way. Is it anticipated that all of your ammonia still wastes then will go to municipal sewers? These are wastes that cause taste and odor problems at times and I think are of particular concern.

MR. DUNSMORE: Well, the first step, of course, is to make a trial run. The equipment is now under order, and we are awaiting delivery of it so that both the waste treatment plant operator at Gary and our plant personnel can have experience under live operation. If that proves successful, and both they and we and the consulting engineers believe it will, then the next step, of course, will be to hook up a permanent setup to treat that waste in the Gary treatment

plant.

MR. POSTON: In the newspapers I noticed that one of your competitors has already made contracts with East Chicago to provide treatment for their ammonia still wastes in the East Chicago plant.

Evidently they have made these tests. I wonder if it would be an advantage to have an interchange of technical information to enable them to contribute some information that would be of assistance to you to get this job done a little quicker.

MR. DUNSMORE: Well, Mr. Poston, as you are well acquainted, the basic research has been done, and there is little or no new or doubtful information about that. However, there still remain operating problems that the specific treatment plant would have and the ways to get it there. That is why the trial run and the temporary installation of equipment to do this.

MR. POSTON: There is another thing. I wondered if you have any estimates of the amount of waste that you still have to take care of to meet the criteria set forth by the technical committee.

MR. DUNSMORE: Well, I would like to answer that in two ways if I might.

One is that, as you are aware, we have had very

little time to review and digest the total meaning of the technical committee report, partly because of my necessity to have a vacation, and partly because I didn't get it any sooner.

I think there is a second point about it. I like the concept, incidentally, that the technical committee established of the outer waters, the inner or closer waters, and then the onshore waters. I do not believe that this has been translated by us or by anybody else into design type of detail. We still plan to do some designing, however.

MR. POSTON: Pardon me?

MR. DUNSMORE: We still plan to design and build, but we don't have the precise data that you are indicating.

MR. POSTON: Do you have the information required to complete your design now from the standpoint of amounts of wastes?

MR. DUNSMORE: We have a very competent consulting engineer now that is making these studies, and as indicated in the report he will be done in December of 1966. He is making treatability studies as part of his contract.

We are sure we will have the answers to your questions by that time.

MR. POSTON: Thank you.

MR. STEIN: Are there further questions or comments?

Herbert J. Dunsmore

You know, I think we are certainly making progress on this, Mr. Dunsmore.

Do I understand that you feel that you will not be able to give us a definitive judgment on the time schedule for completion until you have completed your studies in December 1966?

MR. DUNSMORE: Well, as I see it, we have two problems. One is to wait, of course, until the engineering details are done. I think concurrently with that we have the problem that I indicated of translating these water quality criteria into what it would mean in removing constituents from our effluents.

MR. STEIN: Well, I recognize that, but I think in other cases we, generally with the States, have established time schedules giving a particular time for study, preparation of plans and specifications, and construction even before the study is completed.

I am not sure that I get the concept that the studies have to be completed so that dates for authorizing and completing each stage of the program can be set.

It has been the practice, and I think that is true of both States here, to take a study period, a development of plans and specifications period, and set completion dates before the study has been completed. This has been the usual

practice as far as I can determine of both Indiana and Illinois and the normal operation of their water pollution control program, and it has certainly been ours.

MR. DUNSMORE: Well, I think the pictures speak for themselves that we are now constructing and have constructed tremendous facilities in the last ten months. Many of them are not completed yet. This program of construction will be proceeding at a vigorous rate until they are operable.

MR. STEIN: Yes.

MR. DUNSMORE: In each step along the way we go to the Indiana State Board of Health and the Indiana State Water Pollution Control Board for approval, and it is at that time that the design limit is set and the time that the facilitity will be constructed.

MR. STEIN: Sir, as a matter of fact, I am very impressed. I think the pictures speak for themselves. It is a very good presentation.

I saw Joe McGintey here before. You know, at first I was impressed by the fact that you really could do it. And then you anticipated one of the thoughts I had when I first began seeing your pictures, and that was how big your mills were and how little the facilities were to take care of it. And if that's all we needed, I wondered by we hadn't done it before. Then I found you had two slides there.

You know, U. S. Steel presentations are always a masterpiece. Slide 21 showed a five-stand cold reduction mill which occupied approximately 7,500 square feet of space, while the complex treatment facilities for cold rolling oils, Slide 22, occupied 24,000 square feet of space, three times as much.

Then I took a second look and saw how tall those cold reduction mills were, and then I figured I knew why you didn't list that a cubic feet of space. (Laughter)

MR. DUNSMORE: Well, it is an interesting point. But the other thing you should note on that is that treatment facility goes underground a long ways, so it is probably three stories underground. The cubic feet are probably still three times as much.

MR. STEIN: But I am really delighted that this can be done.

By the way, do you anticipate that you will have success with that underground storage?

MR. DUNSMORE: Of acid?

MR. STEIN: Of acid.

MR. DUNSMORE: Our geologists and the State geologists have assured us that there is, fortunately, an abundant aquifer that can take the acid wastes, and we are sure that it will.

Herbert J. Dunsmore

MR. STEIN: Okay. Let me ask you the next question, and if you want it off the record we will go off the record. But this is just for my own information.

What is that tubing made of inside of your casing? Is that steel?

MR. DUNSMORE: It is a plastic type material.

MR. STEIN: Thanks.

MR. DUNSMORE: But I don't know the specific name of it.

MR. STEIN: Okay. Thank you very much.

MR. POOLE: Next I'm going to call on Mr. J. S. Baum, who is Waste Disposal Coordinator for Cities Service in East Chicago.

Joseph S. Baum

STATEMENT OF

JOSEPH S. BAUM,

COORDINATOR OF WASTE DISPOSAL,

REFINING DIVISION, CITIES SERVICE OIL COMPANY,

EAST CHICAGO, INDIANA

MR. BAUM: Mr. Chairman, Conferees, ladies and gentlemen:

I am Joseph S. Baum, Coordinator of Waste Disposal for the Cities Service Oil Company Refining Division, East Chicago, Indiana.

In my report to you at the conference held March 2-9, 1965, I outlined improvements that had been made to abate pollution at the Cities Service Oil Company's petroleum refinery located at 4900 Cline Avenue, East Chicago, Indiana. Also, in that report I reviewed the refinery's program for 1965 to further improve the quality of the refinery effluent. That program was:

1. Install pH recorder.
2. Install automatic sampler.
3. Treat delayed coker condensate water.
4. Make pilot plant test run to lower oil content.

Today I want to tell you of the progress made on this program and the resulting water quality improvement of the refinery effluent water.

Joseph S. Baum

The improvements made in 1965 to abate pollution are as follows:

1. Installed a pH recorder on the refinery process water. This installation was completed and put in service in March 1965. The pH recorder is used to detect abnormal operating conditions occurring within the plant. The effectiveness of this control has exceeded our expectations. The information has assisted personnel in detecting trouble and locating the source. As a result this has permitted more prompt remedial action.

2. An automatic effluent sampler was installed in April 1965. By taking 24-hour composite samples a more realistic evaluation of the quality of the refinery effluent water is possible. Also, in September 1965 an automatic sampler was placed in service on the plant intake water. From the analysis of the intake and effluent samples we determine the refinery's contribution in the effluent water.

3. The condensed water from the delayed coker overhead product accumulator contains sulfides, ammonia and phenols. In August 1965 arrangements were completed for pumping this condensate to an existing steam stripper for the removal of

sulfides and ammonia. The stripped water is then fed to a crude oil desalting unit where the phenols are extracted by the crude oil.

4. Pilot plant facilities were installed to study the feasibility of removal of minute traces of oil from the refinery process water. This project will require considerable study before the test run can be fully evaluated.

The plant has continued the practice of shipping waste caustic to prevent these contaminates from entering the sewer system. Since our last report to you, this operation has been expanded to include additional types of waste caustic. From January 1 to December 1, 1965 a total of 1,015,000 gallons of spent caustic has been shipped from the refinery. The revenue from the sale of this waste is far short of being a profitable operation. The net cost of shipping this material has averaged $1200 per month.

In the past three months there has been a decided improvement in the quality of the refinery effluent water. Responsible for this improvement are increased efforts towards good housekeeping practices and completion of our 1965 abatement program.

The following is a comparison of our current results and those reported by the U. S. Department of Health,

Education, and Welfare (HEW) in their report on "Pollution of the Waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and Their Tributaries," submitted February 1965.

In the HEW report, sampling and analysis of the refinery effluent was by the Great Lakes Illinois River Basin Project (GLIRBP) personnel. The current refinery effluent sampling and analysis was by an outside testing laboratory. The figures used in the comparison are an average of three months of operation from daily 24-hour composite samples. The period covered is September, October, and November 1965.

1. AMMONIA - the HEW-GLIRBP report listed a daily discharge of 1140 pounds per day. An average of the three months' period in 1965 was 225 pounds per day or a reduction of 80 per cent.

2. BIOCHEMICAL OXYGEN DEMAND - In the HEW-GLIRBP report there were 7875 pounds per day. An average of the three months' period was 2583 pounds per day for a reduction of 67 per cent.

3. OIL - The HEW-GLIRBP report showed 4040 pounds per day. An average of the three months' period in 1965 was 995 pounds per day or a reduction of 76 per cent.

4. PHENOLICS - The HEW-GLIRBP report listed 130 pounds per day. The three months' average was 38 pounds per day or a reduction of 71 per cent.

5. SUSPENDED SOLIDS - The HEW-GLIRBP report showed 32,000 pounds per day. The three months' average was 6180 pounds per day for a reduction of 81 per cent.

6. PHOSPHATES - The HEW-GLIRBP analysis was 320 pounds per day. A check of three separate 24-hour composite samples taken by Cities Service in June 1965 averaged 31 pounds per day or a reduction of 90 per cent.

Another factor of interest and importance is the low concentration of the compounds in the effluent for the average pounds per day listed above.

	Pounds Per Day	Concentration ppm
AMMONIA	225	0.38
BOD	2583	4.4
OIL	995	1.7
PHENOLS	38	0.064
SUSPENDED SOLIDS	6180	10
PHOSPHATES	31	0.05

These concentrations of the refinery effluent are

below the concentrations in the Grand Calumet River which is the receiving stream. Although the relation varies, the average concentration is approximately three times greater in the river than in our effluent. In other words, we are diluting the wastes in the river.

The above concentration figures represent the total contaminates in the refinery effluent water. A correction is necessary to arrive at the amount of contaminates that have been added by the refinery. This correction with the net concentration in ppm and pounds per day are shown in the following table:

	Plant Effluent ppm	Plant Intake ppm	Net Concentration ppm	Net Pounds/Day
AMMONIA	0.38	0.05	0.33	196
BOD	4.4	0.73	3.67	2172
OIL	1.7	1.19	0.51	301
PHENOLS	0.064	0.003	0.061	36
SUSPENDED SOLIDS	10	10	-*	48

*On numerous occasions, when the lake is riled, the plant effluent is lower than the plant intake.

Although we have made material improvement in the quality of our effluent water by the elimination and reduction of wastes we do not intend to stop here. No water is so clean

Joseph S. Baum

that it cannot be improved. We keep this in mind as we continue our search for methods to further abate pollution.

In Mr. Poole's invitation to present a statement at this conference, he invited comments regarding the technical committee's recommendations. At the time of this writing, a copy of the technical committee's report had not been received; therefore, I will withhold comments until the report can be studied and fully evaluated.

MR. STEIN: Thank you, Mr. Baum.

Are there any comments or questions?

(No response.)

If not, thank you very much for a full and complete statement. We certainly appreciate your contribution to the conference and the cause of clean water.

MR. BAUM: Thank you.

MR. STEIN: Mr. Poston.

MR. POSTON: I note that in your abatement program in 1965 there were four headings on your first page.

MR. BAUM: Right.

MR. POSTON: These consisted of installing a pH recorder, an automatic sampler, and then you treated your delayed coker condensate water and, lastly, made a pilot plant test run to lower oil content.

MR. BAUM: The last item, the pilot plant, is not a

part of the improvement. That is only a study we are making.

MR. POSTON: Then I noted over on the item pertaining to oil it indicated that oil reduction had come from 4,000 pounds per day down to 999 pounds per day or only about 1.7 parts per million. I wondered if you attributed this reduction in oil that goes to the river to the fact that you had made other housekeeping procedures. Or just how did you get this reduction?

MR. BAUM: Frankly, my face is a little bit red, because we put in the pilot plant work after we had so much success in good housekeeping. That was part. Another part was eliminating some other waste caustics from the sewer which cause emulsions.

All of this entire program together made this great improvement in the reduction and removal of oil.

MR. POSTON: Then on page four I noted you indicated that your plant effluent is better than the Grand Calumet River, and I wondered whether or not this had been brought about by dilution of your plant effluent with the cooling water.

I think at the last conference in March you indicated that you combined two flows of waste lines with the cooling waters so that the levels or concentrations of contaminates were very low in the final.

Joseph S. Baum

MR. BAUM: Well, it is true that there is some advantage that we get from dilution water. However, I think our poundage is low. We are not using the intake quantity. Somebody else is getting the advantage of that.

MR. POSTON: Well, I think this indicates that a lot can be done in your plant. I think if you could spread the gospel up the river a little bit and show them how to handle this too, it would eliminate a lot of needs that are going to show up.

Thank you.

MR. BAUM: Thank you.

MR. STEIN: Thank you, Mr. Baum.

Mr. Poole.

MR. POOLE: Next I am calling on George Blaine, Manager of the Sinclair Refining Company in East Chicago.

George A. Blaine

STATEMENT OF

GEORGE A. BLAINE, MANAGER, SINCLAIR REFINERY,

EAST CHICAGO, INDIANA

MR. BLAINE: Mr. Chairman, Conferees, ladies and gentlemen:

I am George Blaine, manager of the Sinclair Refinery in East Chicago, located on that map at the left branch of the Indiana Harbor ship canal.

I bring you a progress report of the Sinclair Refining Company.

The conference on pollution of interstate waters bordering the Calumet region, which was held in March 1965, reached numerous conclusions and recommendations. Four of these called for immediate action by industries which discharge effluent into these waters. We are commenting here on the actions which have been taken by the East Chicago Refinery of the Sinclair Refining Company.

Conclusion No. 9 - Relates to Sanitary Sewage Effluent

For more than 20 years all sanitary sewage from this refinery has been piped to the East Chicago Sanitary District Sewage Plant. In view of this very effective and established practice, no additional measures have been required.

George A. Blaine

Conclusion No. 10 - Relates to Housekeeping Practices and Waste Disposal Facilities

It is the policy of this refinery to continuously emphasize and focus the attention of all employees on the vital problem of preventing and eliminating any condition that would cause pollutants to be discharged into the sewer system.

As a part of this continuing effort, for example, Public Health Service Publication No. 1150, What You Can Do For Clean Water, was recently read and discussed by all supervisors. Copies were then distributed to every employee in the refinery and all workers were urged to read the pamphlet and discuss any questions they might have with their supervisor.

Further study and review of day-to-day housekeeping problems, with emphasis on the prevention of pollution, has become a key subject at regularly scheduled safety meetings.

These meetings have already produced new ideas for the control and reduction of the discharge of pollutants. One such idea, for instance, led to the installation of observation and sampling posts at various manholes in the refinery sewer system. Maps were prepared showing the location of the observa-

tion manhole sites and lists of possible pollutants and their source provided for each observation manhole. This system greatly facilitates pinpointing the source of unusual discharge and enables us to take prompt corrective action.

Finally, to achieve an even closer surveillance of all facilities used in connection with eliminating pollutants from the refinery effluent, a new supervisory position was created in September 1965. Thus, a chemical engineer with extensive operating experience now coordinates all pollution abatement activities throughout the plant.

The following improvements have also been made in the operation of pollution-control facilities:

1. API Separator

The three parallel sections of this separator, which removes oil from the main refinery effluent, have been shut down one at a time for cleaning and overhauling since the conference last March. The frequency of skimming and sludge removing has all been stepped up. As a result of these combined measures there has been a marked increase in the efficiency of the API separator operation.

2. Sludge-Handling System

Two 2,500-barrel cone bottom tanks have been erected and placed in service to facilitate settling of separator sludge. The shape and size of the tanks plus their heating coils make for maximum efficiency in the separation of sludge under all operating conditions. Furthermore, the use of two tanks provides more time for the settling of sludge and thus adds to the effectiveness of the separation process. The heightened efficiency gained through this two-tank operation minimizes the suspended solids in the water recycled to the API separator. This, of course, also contributes to increased efficiency in the operation of the API separator.

3. Ballast and Ground Water Handling System

The ballast and ground water handling system receives and disposes of all ballast water from lake tankers and barges as well as from ground water drainings from the West Tank Farm. A sump and lines have been installed to process ground water from drain tile installations on the north and east boundaries of the refinery and will be placed in service when a pump purchased for this installation is received in January. Processing additional ground water through

the ballast and ground water tankage will reduce the load on the API separators and decrease oil loss in the refinery effluent.

4. Ammonia and Hydrogen Sulfide Stripper

This equipment which was installed in 1950 and improved in 1960 removes ammonia and hydrogen sulfide from process waters. Since the March conference a spare feed pump has been installed to insure continuous operation. Also, a study of operating variables has been made, and a marked improvement of stripping has been accomplished, as evidenced by an 80 per cent reduction in the ammonia content of the stripper bottoms.

5. Canal-Skimming Facilities

A removable floating plastic boom has been installed across the Canal to recover floating oil and emulsion from the Canal surface by means of a novel rotating cylinder recovery pump. This skimming system has been in operation since October and has proved to be effective.

Conclusion No. 11 -- Sampling and Testing

A new sampling and testing program was developed in cooperation with the Indiana Stream Pollution Control Board and all tests are reported to them.

An initial series of 19 tests were made on three 24-hour composite samples of each refinery effluent to thoroughly evaluate the quality of refinery effluents. The results of this survey were reviewed with the Indiana Stream Pollution Control Board and the significant tests selected for monitoring. The eight tests selected for the main refinery effluent are:

Flow
BOD
COD
Phenol
Sulfide
Oil
Ammonia
Suspended Solids

An automatic sampler was installed in October 1965 to improve collection of 24-hour composite samples. Composite samples are tested Monday through Friday and the Saturday and Sunday samples are composited for one test. With the exception of BOD, all of the eight tests have been run on 24-hour composite samples five days a week for many years.

On the intermittent ballast and ground water effluent stream, samples are analyzed twice a week for:

Flow
BOD
COD
Suspended Solids
Oil

George A. Blaine

We will continue to determine flow and oil content each time the ballast tank is discharged to the canal in addition to the complete twice-a-week tests.

Conclusion No. 12 - Construction Time Schedule

The following construction projects were reviewed with the Indiana Stream Pollution Control Board and an October 25, 1965 completion date established:

1. Sludge-Handling Tanks

The project was completed and placed in operation November 3.

2. Floating Oil Boom and Skimmer

This installation was placed in operation on October 11, 1965.

3. Automatic Sampler

The sampler was placed in operation on October 23, 1965.

Other improvements scheduled for the coming year which will make major reductions in the amounts of pollutants being discharged with the effluent are as follows:

1. The ammonia and hydrogen sulfide stripper bottoms contain some 200-250 ppm phenol and small amounts of sulfide and ammonia. Arrangements will

be made with the East Chicago Sanitary District to permit disposal of this stream to the sanitary sewer where it will be treated in the Sanitary District Plant for complete removal of this phenolic waste.

2. All spent caustic containing phenolic compounds is segregated and shipped outside the refinery for processing. All other spent caustic is processed through the spent caustic oxidizer where the sulfide content is now oxidized to thiosulfate. This process is operating efficiently; however, arrangements have been made to dispose of all spent caustic containing sulfide and mercaptans by processing outside the refinery, starting January 1, 1966.

The steps taken to reduce pollution in 1965 have been effective, as evidenced by the fact that the average discharge of practically every pollutant was significantly less in the last six months of 1965 than for the year 1964 even though many of the improvements were not completed until November 1965. The full effect of these improvements, costing almost $200,000, plus the major benefits expected from disposal of the phenolic-bearing waste water to the East Chicago Sanitary Sewer and the disposal of sulfide-bearing caustic outside of the refinery should be reflected in improved effluent

quality in early 1966.

We shall continue to work closely with the Indiana Stream Pollution Control Board and to emphasize pollution control in our operations and planning with full consideration of water quality criteria as they are developed by the HEW conference and the technical committee of the conference.

I thank you.

MR. STEIN: Thank you very much, Mr. Blaine.

Are there any comments or questions?

I have one probably just for the record. In the report of Indiana, referring to your plant they indicated, and I quote from their report, "Additional in-plant controls and improved housekeeping practices are needed to eliminate periodically high BOD, suspended solids, oil, phenol and ammonia in the main outfall."

Do you believe that your program completed at the end of 1965 and your improvements for 1966 will meet these requirements of Indiana?

MR. BLAINE: I certainly do.

MR. STEIN: Thank you.

Well, I think we have made considerable progres today. We will recess until 9:30 tomorrow. We expect that we will complete the public presentations tomorrow

and be able to go into executive session.

At the time we go into executive session we may be able to give you an estimate of the time we may have an announcement.

At the present time we have six more industrial representatives from Indiana to hear from, a report from Illinois, and one from the Sanitary District. We expect to be completed with the public presentations sometime tomorrow afternoon.

We look forward to seeing you all tomorrow. We feel we have made tremendous progress today, and we are evidencing as much cooperation as I have seen in any of these cases from the State people, Federal people, and the industries so far, and I sincerely hope this will continue.

Thank you very much. We will see you at 9:30 tomorrow.

(Whereupon, at 5:05 p.m., the conference was recessed, to be reconvened at 9:30 a.m., Wednesday, January 5th, 1966.)

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